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Proceedings

Davenport (Iowa) Public Museum

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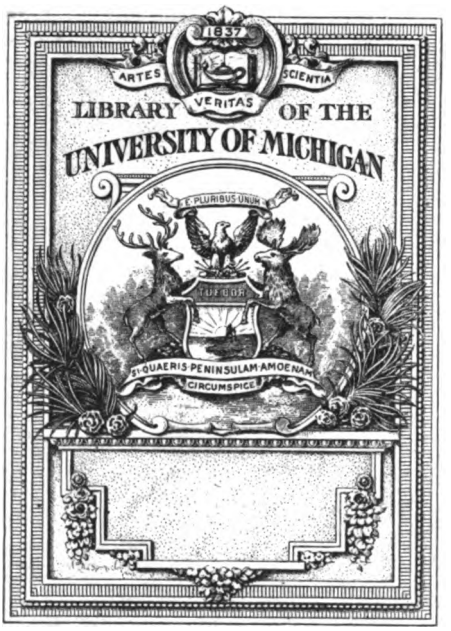

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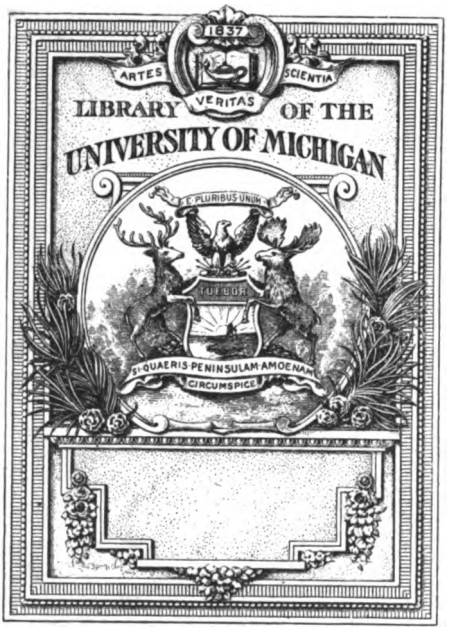

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PROCEEDINGS

OF THE

DAVENPORT ACADEMY

OF NATURAL SCIENCES.

VOLUME VII.

1897—1899.

DAVENPORT, IOWA.

PUBLISHED FROM THE INCOME OF THE

Putnam Memorial Fund.

1900.

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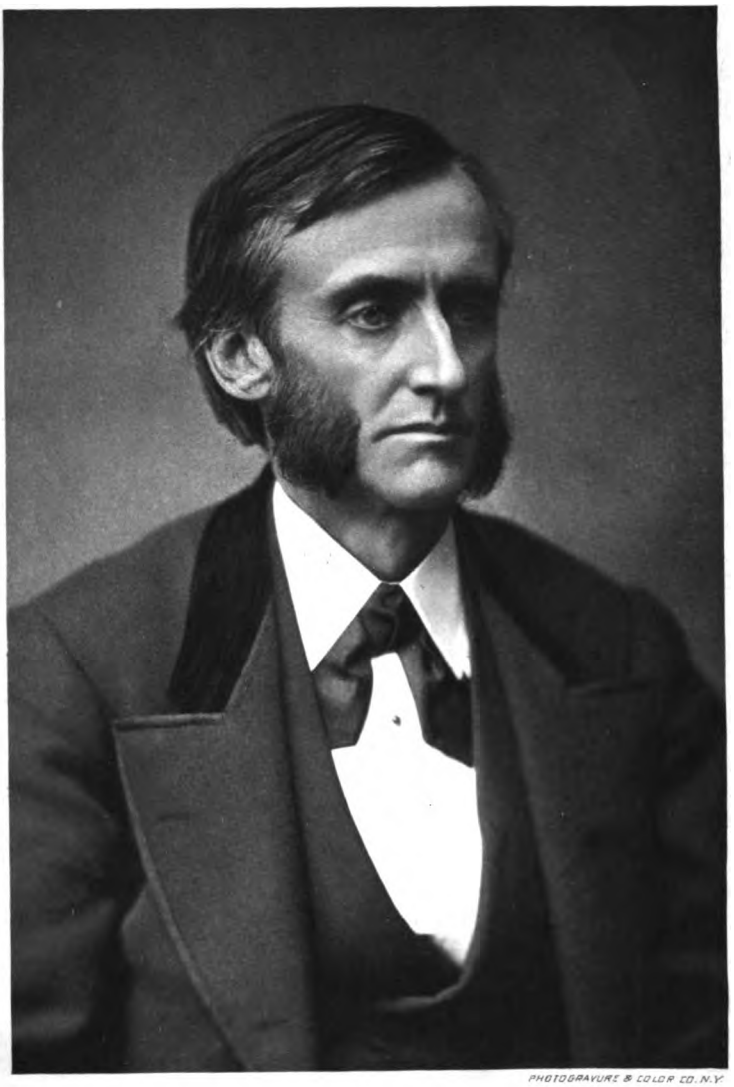

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Charles E. Putnam

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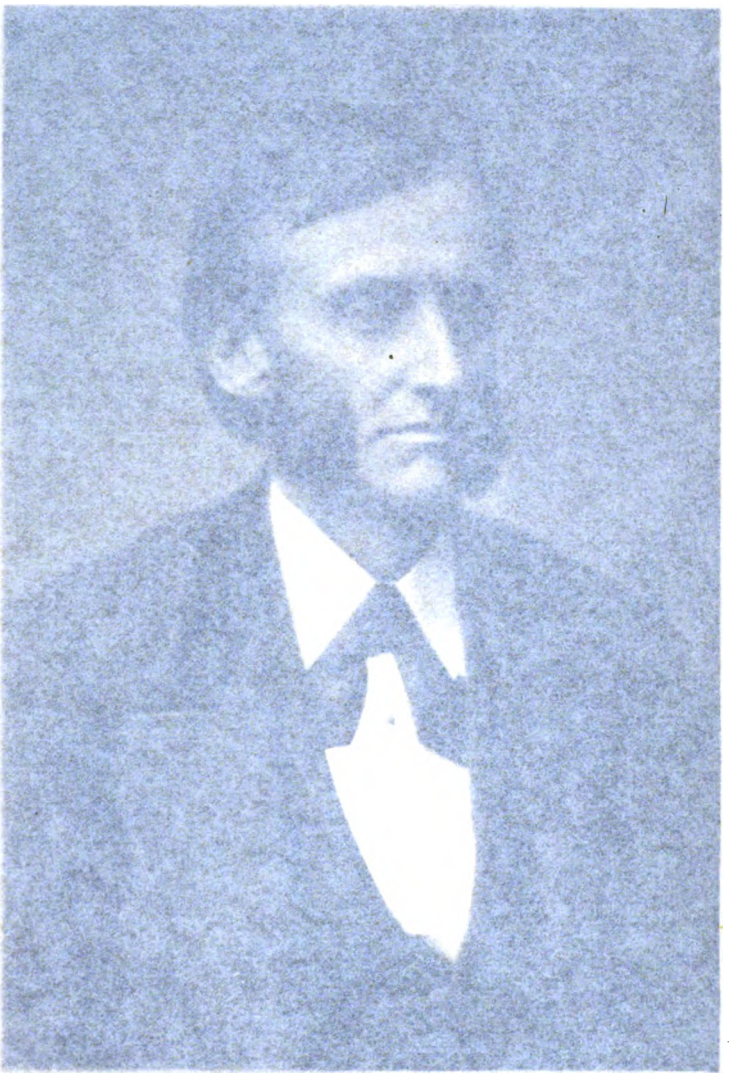

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PROCEEDINGS

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PUBLICATION COMMITTEE—1899.

MRS. MARY L. D. PUTNAM, *Chairman*.

PROF. W. H. BARRIS. DR. C. H. PRESTON.

PROF. SAMUEL CALVIN. DR. JENNIE McCOWEN.

The authors of the various papers are alone responsible for what is contained in them. The date of printing each form is given in the signature line.

WARD BORCHERDT, PRINTER.

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PREFACE.

THE Publication Committee of the Davenport Academy of Natural Sciences takes pleasure in presenting to the scientific world the seventh volume of its proceedings.

For the first time in many years considerable space has been given to entomological papers. This is eminently fitting in view of the fact that the publication was started by J. Duncan Putnam, whose entomological contributions added much to the value of the first three volumes. The present volume contains valuable entomological papers by Samuel H. Scudder, Herbert Osborn, Elmer D. Ball, T. D. A. Cockerell, and H. F. Wickham.

The departments of anthropology and ethnology, in which the Academy takes a deep interest on account of its large and constantly increasing collections in these lines, are represented by three papers by Frederick Starr.

There is also a paper on Scott county geology by Professor W. H. Barris and botanical contributions by L. H. Pammel and H. Harold Hume.

The volume is opened by a biographical sketch of Charles E. Putnam, one of the early supporters of the Academy and twice its President. This memoir is written by his son, W. C. Putnam.

The membership lists at the close of the volume were prepared by Dr. C. H. Preston, and the index by J. G. Udden, Jr., of Rock Island, to whom, and to Edward Borcherdt for the pains taken with typography and press-work, the thanks of the Academy are due. The volume is illustrated by plates of a high grade, much enhancing its value.

While the Academy is chiefly known to the outside world by its published proceedings, material progress has been made at home.

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Both the library and the museum have been steadily growing through gift and exchange, and the recent purchase of the adjoining church property will temporarily supply the urgent need for more room.

Since the establishment of the Putnam memorial fund it has been possible to publish to better advantage than formerly. Already work has been commenced on Vol. VIII. of the Proceedings. A valuable paper by Samuel H. Scudder on the Orthoptera of the United States and Canada is now in the hands of the printer. This will be followed by an entomological paper by Frederick Starr. With these articles and others that have been promised the value of the volume is assured.

DAVENPORT, December 30, 1899.

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Charles Edwin Putnam

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CHARLES EDWIN PUTNAM

A MEMOIR

BY WILLIAM CLEMENT PUTNAM

JUST west of the village of Saratoga Springs, New York, rises "Prospect Hill," above a broad and beautiful valley, and commanding a fine panorama of field, forest, and mountain. In a commodious residence on this noble site there dwelt, in the early part of this century, Benjamin Risley Putnam and Eunice Morgan Putnam, his wife. Here Charles Edwin, the fifth of seven children, was born on February 19th, 1825. The only survivor of this family at present is the youngest brother, Hon. John R. Putnam, a Justice of the Appellate Division of the Supreme Court of New York, who resides in a modern mansion built on the old family estate.

The home at "Prospect Hill" had been founded, not long after the close of the Revolutionary War, by the pioneer settler of Saratoga, Gideon Putnam, the father of Benjamin R. Gideon had, at the age of nineteen, purchased his majority from his father, and soon afterward pushed into the wilderness, with his young wife and child, to do what lay in his power to open up and develop the country which had been won from England by the war. He laid out the village, opened the since world-famous mineral springs, built hotels to accommodate the people who began to be attracted thither in the pursuit of health and pleasure, and gave lands for the establishment of parks, churches, schools, and a cemetery. He represented the highest type of those public-spirited and energetic founders of commonwealths, of which our country has produced so many brilliant examples. Gideon was of

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the fifth generation from John Putnam, the founder of the family in America, who settled in Salem, Massachusetts, in 1634. Gideon's ancestors for more than twenty generations had been landowners in England and New England. He was the nephew of General Rufus Putnam, the distinguished chief engineer officer of the American Army through the Revolution, who in 1788, about the time that his nephew was founding Saratoga, led a band of former officers of the Continental Army and their families across the mountains and down the Ohio River to establish at Marietta the first settlement made by Americans in the new Northwest Territory, thus laying the corner-stone of that vast structure of prosperous states which in the present century has covered the entire Mississippi Valley with its teeming millions. He was one of the Justices of the first Supreme Court of the Northwest Territory, and was afterwards appointed by President Washington a commissioner to negotiate treaties with the Indians, and later the first Surveyor-General of the United States, a position he held for ten years, during which he originated our present simplified system of government land surveys. He filled many other positions of honor and trust, and at his death in 1824 was, with the single exception of La Fayette, the last survivor of the general officers of the Revolutionary Army. General Rufus Putnam was a cousin of General Israel Putnam, "Old Put," the beau ideal of American soldiers, hero of the French and Indian and Revolutionary Wars, and one of the clarion names in history.

It may be of interest to add that among the English ancestors of this family was Sir George Puttenham, who in 1589 published "The Art of English Poesie," one of the first and most important works in English literary criticism. Modern representatives of the family in the field of literature include George P. Putnam, the author and publisher, George Haven Putnam, Professor Frederick W. Putnam, and others, and among jurists, Judges James Putnam and Samuel Putnam of Massachusetts, and William L. Putnam of Maine.

Charles E. Putnam thus started in life with the heritage of an honorable ancestry. Delicate in constitution, studious by habit, genial and social in disposition, gifted with a mind of the highest order, he grew to manhood under the refining and broadening influences of an unusually intellectual and social community. For Saratoga, though but a village, was then for a portion of every year the home, as perhaps no other American community has since been, of most of the men famous in our literature, politics, art, and commerce, with many

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of whom, as a young man, he was thrown into close association. The centre of much of this social and intellectual life during all this period was "Pine Grove," the well-known home of Reuben H. Walworth, the last of the Chancellors of New York. "Pine Grove" was always another home for Mr. Putnam while he remained in Saratoga, and Chancellor Walworth a second father. His formal education was limited to the private schools and academies of the village. After the early death of his father, and in order to be with his mother, to whom he was much attached, he relinquished a cherished plan he had formed of securing a higher education at Union College. But from his earliest childhood he supplemented the education derived from schools by the widest range of reading and study, drinking long and deep from the fountains of learning, and reading diligently every book within his reach. For this he had unusual opportunities in the large and well-chosen library of Chancellor Walworth. Though he had come of an ancestry which for countless generations had been landowners or farmers, he had no desire to follow in their footsteps, nor indeed to enter into any occupation which should not require the constant exercise of his highest intellectual faculties.

He early developed a strong inclination to pursue a literary career, and wrote much for the local newspapers and periodicals. At this period he founded the "Coterie," a charming literary society of the young people of the village, several of the members of which afterwards became eminent in literature, law, and politics. Many papers of merit were prepared by the members and read at their meetings. In this practice of writing in his earlier years, supplementing as it did the great fund of knowledge which had been acquired by his constant reading, there was laid the foundation for the clear and polished style which characterized all of his writings in after life.

But, though the call of literature to him was strong and seductive, though he possessed a highly imaginative and poetical mind, and though it cost him a great struggle to turn aside from it, as it did Blackstone and has many another lawyer since, acting under the advice of his life-long friend, Chancellor Walworth, he finally determined to enter the legal profession. He first read law at Saratoga in the office of Beach and Bockes, the senior member of the firm being William A. Beach, subsequently a resident of New York City, and one of the most eminent of American advocates; and the junior member, Augustus Bockes, afterward for forty years a Justice of the Supreme Court of New York, who is still living in honored retirement at Saratoga. He was admitted

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to the bar in May, 1847, but remained with his preceptors for two years or more. He then spent a portion of a year with an elder brother, who was practicing law in Georgia, and was afterward for a year or so in New York City, in the office of Gilbert Spier and Stephen P. Nash, both of whom have also been very distinguished members of their profession, Mr. Nash particularly having been for nearly fifty years one of the most famous estate lawyers in America. Returning to Saratoga he in 1853 met at the home of Chancellor Walworth Miss Mary L. Duncan, who later became his wife, and through her influence he soon determined to make his home in the West.

It is of this period of his life that Mrs. Ellen Hardin Walworth, the gifted historian, and a lifelong friend of the family, has written: "In the last years before the late war there was no young man better known or more kindly considered in Saratoga than Charles E. Putnam. Belonging to one of the old and honored families of the village and the state, he had grown to manhood in this community an active and lovable boy, an intellectual, genial and fascinating young man, about whom there were varied predictions. His ready smile and charming manner, combined with a slow and easy grace of movement, led the superficial observer to surmise that there was a want of energy and force in his character. Friends who were nearer to his inner life knew even then that the latent fire of a fixed purpose and the forceful will of a strong and gifted man were but casting about for a haven suited to his activities. This was soon found in the great West, where Mr. Putnam rose to eminence as a lawyer, and became one of the leading business men in a vigorous and rapidly increasing city. In the first year of his residence in the West [on December 9th, 1854, at "Elm Grove," the family homestead in Jacksonville, Illinois,] he married Mary Louisa Duncan, the accomplished daughter of Governor Joseph Duncan of Illinois, one of the men who contributed largely to the welfare and progress of that state in its earlier days."

After making a tour through the West in 1853, and visiting the home of his cousin, the late Hon. William H. Clement, at Cincinnati, where he was detained for some time by a severe illness, Mr. Putnam settled in the spring of 1854 at Davenport, Iowa, entering immediately into a partnership in the practice of his profession with Judge Gilbert C. R. Mitchell, a lawyer of eminence and culture, and one of the pioneers of Iowa. From that time to the date of his death Mr. Putnam was actively engaged in the practice of the law in Davenport. His partnership with Judge Mitchell lasted for three years, when the

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latter was elevated to the bench. General Joseph B. Leake, who has since become prominent in his profession in Chicago, was subsequently associated with him for a year. From 1860 to 1886 he was in partnership with Hon. John N. Rogers. The firm of Putnam and Rogers stood in the very first rank of the profession in Iowa, and indeed in the entire West. Their practice was extensive and varied, and included the argument of numerous cases in the Supreme Court of the State and in the United States Courts, and of very many in the Supreme Court of the United States. In all of these courts their arguments were received with the greatest attention, and it was a rare exception when a decision was rendered against one of their clients. Mr. Putnam in his later years gave special attention to corporation and consultation practice, and to the management of large estates and important business interests. For the last year of his life he was in partnership with his son, the writer of this memoir, who had been associated with him in his practice for the preceding seven years.

Although deeply engrossed with the practice of his profession up to the day of his death, Mr. Putnam found time to be interested in many enterprises and institutions for the advancement of the community in which he lived. He assisted in the organization and establishment in Davenport of numerous business corporations, and gave much of his time to their development, even when not pecuniarily interested. He served during many years as President of the Davenport Plow Company, the Mutual Plate Glass Insurance Company, the Oakdale Cemetery Company, and various others. He was connected with the Davenport Gas Light Company for over thirty years, and served as its President during the last twelve years of his life. During his later years especially he gave much of his time and thought to the company last named, constantly introducing new processes in the manufacture of gas, and improving and extending the works. At his suggestion, and under his direction, this was one of the first gas companies in the United States to adopt the system of lighting by electricity in addition to gas illumination. He became profoundly interested in the subject of electricity, and, as was his practice in all matters which he investigated, mastered every essential detail of the science, its literature, and its practical application to light and power.

Mr. Putnam was early impressed with the beneficent influences of savings banks, and in 1870 organized the Davenport Savings Bank, and served as its President for the ensuing fourteen years, giving during all of this period constant and daily personal attention to its manage-

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ment. He prepared and drafted the Savings Bank Law of the State of Iowa, which was adopted by the Legislature with a single change permitting such banks to do a commercial business, a change which has been regarded by financiers as constituting a grave defect. This law guards the interests of depositors by the most stringent provisions, has been pronounced a model by the highest authorities, and is extensively noticed by Emerson W. Keyes, in his "History of Savings Banks." It has remained unaltered since its passage, and under its influence the savings banks of the State have been successful beyond hope or precedent, and have largely developed the thrift, prosperity, and high average of intelligence and education, for which Iowa has become so well known. In Davenport alone, with a population of about thirty thousand people, there are now (1897) nearly ten million dollars of deposits, making it pro rata one of the wealthiest cities in the Union. Mr. Putnam contributed articles to various financial journals and books upon the subject of savings banks, besides extended reports and addresses to the directors and depositors of the bank over which he presided, all displaying wide research, and evincing the deepest interest in the subject.

In 1876 Mr. Putnam was elected President of the First National Bank of Davenport. The affairs of the bank had become seriously involved, and required the skilful treatment of a firm and experienced hand. This he conscientiously gave through a portion of one year, at great personal sacrifice. After carrying the bank successfully through its troubles he felt compelled to retire, owing to the numerous other demands upon his time.

Such is a brief outline of Mr. Putnam's professional and business career. This, however, presents but one phase of his life. His early love for literature, philosophy, art, and science remained with him through life, and always occupied the supreme position in his thoughts. He continued to be a constant reader of books, in every department of literature, science, and philosophy, and gathered at his home one of the largest private libraries in the State, most of the volumes of which he read and mastered. He kept fully abreast of the thought and progress of the world in almost every line of activity, subscribing to, and examining carefully as they appeared, nearly sixty different periodicals, including almost all of the prominent scientific and literary journals. He was a thorough student of all that he read, and his mind was a great storehouse of well-arranged knowledge. He had for many years prior to his death been preparing a large amount of material for several

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literary and scientific projects which he had in mind, and intended to devote the later years of his life to elaborating these and publishing the results of his labors. All of this material, representing the work of the "leisure hours" of the mature years of his life, was lost in the destruction of his home by fire six weeks prior to his death. The loss of this work preyed heavily upon him, as he felt that he must begin all over again, which at his time of life was most disheartening. And yet, characteristically, he took a cheerful view of the situation, and immediately commenced to plan for the future. For in this work was where his heart lay, and though a life of intense activity in doing more than his share in conducting the practical business of the world had prevented him from making a permanent contribution to the literature of his time, yet his mind always recurred to this cherished object of his ambition, and it was his hope that he might live to accomplish it.

Mr. Putnam took an active interest in all public educational and literary work. He served for five years as a member of the Board of Education of Davenport, introducing reforms into the methods of instruction and management of the public schools, and retained through life a deep interest in all matters pertaining to their welfare, as well as to the general cause of education in all of its phases. He served as a trustee of the Davenport Library Association, and was an active supporter of and contributor to its work. In earlier years, long before the days of "University Extension," he was instrumental in bringing many eminent lecturers to Davenport. He was a trustee of the First Presbyterian Church for a long term of years, and, although his views of religion were not bounded by any creed or sect, he was a constant attendant at its service.

During his first years at Davenport he belonged to various social and literary organizations, among others being the organizer in 1857, and President during its existence, of the Davenport Literary Society, which was one of the earliest associations of the kind in the West and had an important influence upon the growing Western town. He was also one of the founders and first President of the "Excelsior Society," composed of former residents of New York. He delivered many addresses before these and other kindred associations. He took no part in the practical work of politics. It had no attractions for him, and he never held a political office, though throughout his life he kept fully abreast of all passing political problems. Before the war he was a whig, during its continuance a unionist, and after its close a democrat with very independent proclivities, always voting for the best man

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regardless of party. The only outdoor address he ever delivered was an eloquent and patriotic speech on the Fourth of July, 1860, delivered during the stress of the memorable campaign which preceded the war.

Without being a specialist in any department of science, Mr. Putnam was a conscientious and constant student in many of its branches, and gave it much of the leisure of a busy life. He became a member of the Davenport Academy of Natural Sciences in 1869, not long after its organization, serving as a trustee for fourteen years, as its Treasurer during two years, as Chairman of its Finance Committee for many more, as its President during the years 1885 and 1886, and was at the time of his death its Corresponding Secretary. He, together with his wife, had become especially interested in the Academy in order to assist the scientific life-work of their eldest son, Joseph Duncan Putnam. This son, although burdened with a fatal disease during the last eight of his brief life-span of twenty-six years, succeeded in becoming eminent not only in the special field of entomology to which he devoted himself, and which gave him a world-wide reputation, but also in putting the Academy, its active work, its museum, its library, its correspondence, and its publications, upon a permanent foundation. The sympathy between parents and son was always very strong, and in all of the projects which the latter formed for the advancement of the Academy's work and welfare, he found a friend and counselor, and a strong financial supporter, in his father. After their son's death, in 1881, Mr. Putnam and his wife continued their active participation in the work of the Academy, having a strong feeling that the different departments of this work, which the son had so largely founded, should not suffer from neglect. During the remainder of his life Mr. Putnam gave much of his time and thought to this institution and its welfare. It is owing largely to his oft-repeated and unstinted generosity, and to his wife's untiring labors, that the Academy has its permanent building, and that it has been enabled to keep up its publications and carry on its work. During his presidency he published, in the Academy Proceedings, and separately, an extended treatise upon the "Elephant Pipes and Inscribed Tablets in the Museum of the Academy of Natural Sciences, Davenport, Iowa," containing an exhaustive discussion of the scientific problems and other questions involved, and which called forth numerous letters of commendation from eminent scientists in all parts of the world. He delivered two annual addresses as President of the Academy, which are published in its Proceedings. The scientific work which he accomplished, compar-

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atively limited though it was, and undertaken late in life, can at least be regarded as an index of what he was capable of doing, and of what he would undoubtedly have accomplished had his life been spared to carry out his projected undertakings. He had planned and prepared material for extensive work in the fields of archæology and ethnology, the "science of man," and his life on earth, being the subjects to which he gave much of his thought and labor during his last years.

In 1895, eight years after Mr. Putnam's decease, his widow established, largely through the assistance of a bequest from his sister, Mrs. Mary Putnam Bull, of Tarrytown, New York, a permanent fund of Ten Thousand ($10,000.00) Dollars, to be known as the Putnam Memorial Fund, in memory of Mr. Putnam and of his son, Joseph Duncan Putnam, the income of this fund to be used toward carrying on the publications of the Academy. In view of the long and intimate association of father and son with this institution, no more appropriate memorial could have been founded, as it ensures the continuance of the important work which both had so much at heart.

But probably the most charming side of Mr. Putnam's life was that presented during the hours spent in his own home. Here, with a wife of kindred tastes and sympathies, with a family of ten sons and one daughter, to the happiness, education, and advancement of all of whom he was absolutely devoted, and surrounded by the books which served as his lifelong and intimate companions, he really lived the best part of his life, the part which he most highly prized and would least have done without. In May, 1863, he purchased and removed to an estate of eighteen acres in the outskirts of the city, commanding an extensive view of the Mississippi valley. To the embellishment of this beautiful suburban home, with its wooded avenue and its sloping lawns and vineyards, which he appropriately named "Woodlawn," in memory of the well-known estate at Saratoga adjoining his father's home, he devoted many of his leisure hours for nearly a quarter of a century. He took an active interest in the practical cultivation of trees and fruits, and his fertile and active mind was continually suggesting improvements to the estate. Here he passed the remainder of his life, always glad to return to its peaceful repose when the business of the day was over. It was a truly ideal home which he founded. Nothing that could make the home life attractive and cultivating to his children was omitted. He encouraged them while young boys in undertakings of theirs for the writing, printing, and publication of a magazine bearing the title of the "Star of Woodlawn," and of other papers; in the conducting of

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a complete amateur printing office; and in the performance of private theatricals through the winter months for a number of years, played upon a regular stage with appropriate scenery and all of the accessories. He supplied them with a well-equipped carpenter and machine shop, from which were turned out rowing and sailing boats, canoes, and mechanical work of various kinds. He was a firm believer in recreation, providing his children with a billiard table and various indoor games, as well as riding horses and all kinds of outdoor paraphernalia so dear to the hearts of boys. He guided them in their reading and studies, often reading aloud to them with his rich, musical voice from the works of the best writers, having an educating influence of the highest value in the formative stage of his children's minds. Under the stimulus of his character and example the children, while very young, formed among themselves, and carried on for years, a society for historical research and study where original papers were read each week, theatrical, amusement, and stamp companies, besides conducting a juvenile savings bank, a post-office, and other institutions. He lived again in the life of each of his children, and was always interested in and sympathetic with whatever interested them.

But we are constantly reminded how temporal is everything in life. At noon on June 3rd, 1887, the fell destroyer came in the shape of fire and swept away the residence at "Woodlawn," the scene of so many years of happiness. Mr. Putnam was the only member of the family who reached the house before its total destruction. The home of twenty-four years, with much of its accumulated treasures and household gods, a large portion of his library, and all of his own and his sons' literary work and manuscripts, were devoured by the flames in an incredibly short time. The nervous shock was a terrible one to him, and the blow was deeply felt, yet his buoyant temperament at once made the best of the situation. Over the smoking ruins he began to lay plans for a future home, and never showed the white flag of discouragement.

The family moved temporarily into a cottage on the grounds. Here, six weeks later, on one of the hottest days ever experienced in this climate, Mr. Putnam was suddenly stricken down by disease. At seven o'clock in the morning of the second day afterwards, on July 19th, 1887, in the sixty-third year of his life, his soul passed peacefully into the unknown realm the mysteries of which had always had for him an absorbing though speculative interest, and the intense activities of his life were ended. His widow, six sons and one daughter survived him,

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and three days later his remains were borne amid a large concourse of friends to the beautiful Oakdale Cemetery, which during his life had been a cherished object of his care.

In his death there passed from earth one of nature's true noblemen. Speaking from a long and intimate association with him, in the home and in the office, the writer can truthfully say that he was thoroughly and unfailingly honest and just in all of his dealings with his fellowmen; throughout life he treated every one with the utmost courtesy and the fairest consideration, being instinctively a gentleman in all that the term implies; he was the most generous and kind-hearted of men, and it was well-nigh impossible for him to refuse assistance even against his better judgment; he was untiringly industrious, and never neglected his duty in doing to the best of his ability any work which lay before him; he accepted the decrees of fortune, good or evil, with calm equanimity, and always courageously looked upon the hopeful side of life; he cared nothing for money except to use it for the good of others, and, instead of accumulating a fortune, spent one as he made it in ministering to the happiness of his family and friends, in the diffusion of knowledge, and in helping the poor and the distressed. With all his great talents, and notwithstanding the position he had gained in so many fields of human endeavor, he was thoroughly modest, thinking always of others rather than himself.

His predominating characteristics, however, were his unselfishness and his industry. Though his natural tastes were all those of a student, and his inclinations were towards a quiet life of repose, where his literary and scientific powers could have enjoyed full play, he resolutely laid everything aside in order to mingle with his fellow men, perform the duties which he felt belonged to him in the economy of life, and thus make the most he could, for the benefit of others, of the powers which had been given him. And he exemplified by his industry how much may be accomplished, in many different directions and spheres of activity, by a well-ordered life, not allowing the cares of business, of money-getting, or of ambition, to prevent him from doing his whole duty to his family, to his friends, to his fellow citizens, and, so far as lay within his powers, to the enlightenment and uplifting of the human race.

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OUR LOCAL GEOLOGY

BY W. H. BARRIS

INTRODUCTORY AND EXPLANATORY.

In former papers on our Local Geology, the author treated of the discovery, character, and contents of the lowest series of fossiliferous rocks here exposed on the Mississippi River.

They had been necessarily overlooked in the earlier Geological surveys of the State, inasmuch as they had not been discovered until after those surveys were completed. Lithologically they seemed distinct from any of the rocks with which they were here associated. Their more characteristic fossils were new and undescribed, differing widely from any of the forms above them. It was acknowledged they underlaid what was considered the western extension of the Hamilton Group of the New York geologists. From these they seemed widely separated. There was a difference in rock structure apparent at a glance. Fossils were new, some having an external resemblance to those of the Corniferous. The appearance of certain corals and the presence of a coral-reef suggested such reference.

It was not simply an individual caprice or fancy that led to such identification. The highest authorities in both Iowa and Illinois geology had plainly and fully expressed their opinions. Professor Hall had traced the rocks of the Upper Helderberg through and below the city, had defined their position in Rock Island as underlying the Hamilton.* Professor Worthen considered them to be most nearly allied to the Hamilton of New York, and yet claimed they contained some fossils that in that State were characteristic of the Upper Helderberg. Hence, his conclusion was that they were really the western representatives of *both* these formations.† In view of such facts, and in deference to such authority, the local workers in the rocks naturally came to the conclusion that both the Upper Helderberg and Hamilton were here represented. That such conclusion was not altogether satisfactory is made evident by the fact that in neither of the three col-

* Geology of Iowa, Vol. I., page 86.

† Geology of Illinois, Vol. I., page 120.

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lections here made—that of the College, the Academy, or my own—were any of the fossils labelled "Corniferous" or "Upper Helderberg."

In the present paper, attention is directed not as heretofore to the study of a single fossiliferous rock, but extended to the whole series of which it here forms a part. This series admits of three natural divisions.

These were first recognized and published by Professor Calvin. To the upper member, as developed at Buffalo and vicinity,* he gave the name of Spirifer Parryanus beds, in view of the presence of that spirifer; to the next lower the name Spirifer Pennatus beds, that being its characteristic fossil. To the lowest the writer suggested the name of Phragmoceras beds—the *Phragmoceras walshi* being its most marked fossil in this vicinity. The Professor favored its application *simply* as a convenient local name. The name of each bed thus suggests its distinguishing fossil.

It is proposed to invite attention to each of these beds in the order of its exposure, to mark out something of its extent, its character and contents, as exhibited in the various localities on the river, to show the relations these beds sustain each to the other, and the *true significance* of such relationship.

THE PHRAGMOCERAS BEDS.

These comprise the lowest fossil-bearing rocks found in this vicinity. They extend from a point in the eastern portion of the city, and are seen on both sides of the river as far west as the Cook quarries. They also appear on Rock River, near Camden, Illinois.

The earliest indication of their existence is furnished by the discovery of the trilobite known as the *Proetus Prouti* of Shumard.† In his description of it, he writes: "I am indebted to the kindness of my friend, Dr. H. A. Prout of this city, who found it some years ago a short distance *above the town of Davenport*, Iowa, near the water level of the Mississippi, in 'compact grey limestone' supposed to be of the age of the Hamilton Group of the New York series." This *compact grey limestone* of which he writes is one of the persistent elements of the Phragmoceras beds. While every vestige of the rock *in place* has disappeared, the original specimen on which Shumard based his description was lost in the great fire at St. Louis, which swept away his whole collection. Fortunately a second and third specimen

*Natural History Bulletin of the Laboratories of the State University of Iowa, Vol. I., page 26.

†Transactions of the Academy of Science of St. Louis, Vol. II., No. 1, page 111.

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was found in Cook's quarry just below the city, and which at his request was loaned to Professor Hall, who redescribed the species, illustrating both specimens in his great work on Palæontology.*

The next exposure westward was long known as the LeClaire quarry, located within the city limits, but now entirely obliterated. For years it had been visited, and collections made mainly from the Spirifer Pennatus beds. The quarry had the appearance of being opened for the sake of procuring stone suitable for building purposes. Excavation had gone down into the Phragmoceras beds, when the next succeeding limestones and shales must have become loosened, and resulted in a confusion and commingling of rocks and fossils of both beds. Here, as elsewhere, the Phragmoceras beds included their two most marked divisions. The upper consisted of a series of thin, hard, non-continuous layers of limestone. On the surface of many of these were crowded the detached valves of Owen's *Atrypa comis* (the *Gypidula occidentalis* of Hall), and corresponding so closely to Owen's figure, particularly in the absence of frontal plications, that on mentioning the circumstance to Dr. Parry he responded that he had accompanied Dr. Owen to this very locality. Beneath these thin slabs could be traced the other member stretching for eight or ten feet down the bluff, a light grey, thick, heavy-bedded rock, in the roughened face of which stood out the weathered forms of some of its most ordinary fossils.

As a third locality, we have the extension of these beds across the river into Rock Island. One difference between this and other exposures was that the series of upper thin layers was to some extent absent. The upper member of the Phragmoceras beds graduated so gently into the lower part of the Spirifer Pennatus beds as scarcely to be recognized. Yet Professor Worthen did not fail at once to detect the difference.

In his description of the Devonian limestone between Rock Island and Moline, he separated it on purely lithological grounds into three divisions. The upper two correspond to Professor Calvin's Spirifer Pennatus beds. The lower is the Phragmoceras, and cannot be better described than in his own words: "These shaly limestones are underlaid by *a fine-grained grey or dove-colored limestone*, the upper part becoming tolerably massive." †

*Natural History of New York. Palæontology, Vol. VII., page 126, Plate xxiii., figures 16-18.

†Geology of Illinois, Vol. I., page 121; Vol. V., page 223.

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In a succeeding volume he speaks of its "being destitute of fossils except in the upper layers, near its junction with the shales."

These "upper layers," in virtue of their position and character, constitute the upper member of the Phragmoceras beds as they are elsewhere exhibited. The Professor further claims that there were no fossils in these beds, differing from those in the beds above them (the Spirifer Pennatus beds). He overlooked the fact that in the very volume in which the statement is made he had described one of its most characteristic fossils, the *Spirifer subundiferus*. In the next volume two others equally characteristic, the *Phragmoceras walshi* and *Calceocrinus barrisi*, were described and figured. Recrossing the river, in Cook's quarries, just below the city, on the bottom-land, and but a short distance from the river and little above its level, was the typical realization of the Phragmoceras beds.* As originally described, the southern portion had been first worked, presenting for years the two marked divisions by which they were distinguished. The lower, answering to Professor Worthen's description, was a fine-grained, grey or dove-colored limestone, attaining a thickness of eight or ten feet, arranged in regular layers of a foot or more in thickness. Irregularly disseminated through the mass was found the greater part of the larger and best-preserved fossils. Conspicuous among them were the Cephalopods, Brachiopods, and Crinoidea. Above these were thin, non-continuous layers from two to three inches thick, extending upwards two or three feet, with abundant coralline forms, embracing Cyathophyllum, Favosites, Cladopora, Alveolites, and Stromatopora. On the surface of the ground the same forms occurred in abundance, while in a neighboring quarry they were massed together in a reef. As the quarries were worked northward these layers became gradually thickened, till they assumed something of the character of the rock on which they rested, carrying few fossils. Occupying their place was a stratum of one to two feet in thickness, roughened with the broken valves of a shell, in external form closely resembling a Rensselæria, the greater number partially weathered, and so compacted together that while they existed in large numbers it was difficult to extricate a single individual from the mass without such breakage as to place it beyond all hope of positive identification. This today forms an extended layer capping the limestone beneath, and stretching on a quarter of a mile or more towards the bluff, excluding through the whole distance almost every other form of fossil.

* Proceedings of the Davenport Academy of Natural Sciences, Vol. II., page 261.

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The following lists have been carefully prepared to meet the wants of those interested in the subject. All the fossils enumerated with scarce an exception were gathered from this locality. With the filling up of the quarries first worked and the gradual change in the rock northward, with corresponding decrease of fossils, it is not very probable that many of the rarer forms in the first list will again be met with. Yet it is possible that on further examination some of these may be found to have passed up into the Spirifer Pennatus beds, and in such case should be inserted in the second list.

1.—List of fossils characteristic of the Phragmoceras beds:

Aulopora conferta.....Winchell.
Heliophyllum coalitum.....Rominger.
Alveolites minimus.....Davis.
Cystiphyllum conifollis.....Hall.
Pachypora fischeri.....Billings.
Gypidula comis.....Hall.
Pentamarella micula.....Hall.
Pentamarella arata.....Hall.
Productella spinulicosta.....Hall.
Spirifer subundiferus.....Meek & Worthen.
Rhynconella intermedia.....Barris.
Newberria johannis.....Hall.
Strophodonta concava.....Hall.
Megistocrinus nodosus.....Barris.
Stereocrinus triangulatus.....Barris.
Calceocrinus barrisi.....Worthen.
Straparollus lativolvis.....Calvin.
Gyroceras pratti.....Barris.
Phragmoceras walshi.....Meek & Worthen.
Actinopteria decussata.....Hall.
Conocardium cuneus.....Conrad.
Paracyclas elliptica.....Hall.
Paracyclas lirata.....Conrad.
Proetus prouti.....Shumard.

2.—Fossils passing from the Phragmoceras into the Spirifer Pennatus beds:

Astræospongia hamiltonensis.....Meek & Worthen.
Acervularia davidsoni.....Hall.
Crepidophyllum archiachi.....Billings.

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Alveolites goldfussi ..... Billings.
Spirifer fimbriatus ..... Conrad.
Atrypa reticularis ..... Linnæus.
Platyostoma lineata ..... Conrad.
Phacops rana ..... Green.

3.—Undetermined fossils:

Heliophyllum, *Alveolites*, *Cladopora*, with *Bellerophon*, *Euomphalus*, and *Gomphoceras*.

One other locality is worthy of a passing notice. Professor Worthen claimed that the whole floor of Rock River, from Camden almost to the Mississippi, is composed of this rock.* He writes: "The massive solidity, conchoidal fracture and white dove-color of the stone indicate it belongs to the lower portion of the formation." Few fossils were found in it when he wrote. Subsequently, when the river was drained, many of the rarer forms were found.

A few rods from the bridge, in the rise towards the bluff, are the remains of an old quarry in which the upper thinner layers are more than usually thickened and carrying some of the usual fossils in excellent condition.

It is only in the Phragmoceras beds, and confined to their lower portion, that Ganoidal remains have been found. Fragments of plates occur measuring nearly an inch in thickness and several inches in length and breadth. As in other localities, their entire surface is covered with small stellate tubercles. Apparently similar fragments appear among fossils of the Hamilton formation of Ontario, Canada, in their best known localities. These fragments have been formally acknowledged by Whiteaves, in the Geological and Natural History Survey of Canada, as parts of the cranial plates of the *Macropetalichthys Sullivanti* Newberry,† at first described from the Corniferous of Ohio.

SPIRIFER PENNATUS BEDS.

Between these beds and those just described a marked contrast exists extending to rock and contents. There are soft clays, irregularly bedded, light-colored limestones, often separated by bands of calcareous shale, and, in addition, holding a prominent place and maintaining a definite position in these beds, is a persistent encrinal limestone.

* Geology of Illinois, Vol. V., page 227.

† Contributions to Canadian Palæontology. Vol. I, Part II., Sec. 2, page 119. Geological Survey of Ohio. Palæontology. Vol. I., page 290.

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Fossils assume a greater variety of forms. There is an increase both in the number of species, as well as multiplicity of individuals.

Adopting the same order as before, we may revisit the LeClaire quarry. Though limited in extent, the lithological and faunal differences are at once recognized. The soft clay enclosed a profusion of small fossils. With the minute, frail, delicate bryozoa were mingled brachiopods equally small and delicate. The limestone carried the common forms. Of the two American species of Hexacrinus, one was found in the encrinal limestone of this quarry. The Academy was fortunate in having it studied, described and figured by Messrs. Wachsmuth and Springer, who gave it the name of *Hexacrinus occidentalis*.*

Of these beds, as exposed in Rock Island, no later or better summary can be given than that by Prof. Udden.† The section described was near the Rock Island depot, and divided into three parts: "The upper twenty feet was composed of shaly limestone and calcareous shale, containing throughout fossil brachiopods and, near the top, stems of various crinoids. The next six feet comprised three ledges of limestone separated by seams of shale, and containing about the same fossils as the beds above. The lower consisted of three solid ledges of a strong limestone, seven feet thick, containing a less number of brachiopods and more corals." The two upper portions represent the Spirifer Pennatus beds, the lower, the Phragmoceras.

From this bluff exposure at Rock Island, crossing the river, we descend to the low bottom land below the city in which Cook's and neighboring quarries were wrought. The entire mass of the Spirifer Pennatus beds has almost disappeared. The bluff from which they were detached is more than a mile to the northward. The surface rock through that whole distance is the Newberria strata of the Phragmoceras beds, and only in its slight irregularities and shallow troughs are traces of the shale to be found. At the quarries the limestones and shales represented at Rock Island by over thirty feet of thickness have dwindled down to two or three feet, still carrying their larger fossils. Underneath is a soft clay like that in the LeClaire quarry, crowded with exquisitely-preserved small brachiopods and as equally delicate small bryozoans. There is no further exposure through a distance of five or six miles, where we reach the quarry of Mr. John Sauer. It is

* North American Crinoidea, by Wachsmuth and Springer, Vol. II., page 745, and Atlas, Plate lxxviii., fig. 10.

† Report of the Illinois Board of World's Fair Commissioners at the World's Columbian Exposition, page 136.

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situated on the brow of the bluff facing the river, and shows the following section:

	FEET.
1. The uppermost member is a fine-grained limestone with few fossils, layers growing thinner towards the base. . . .	5
2. Encrinal limestone resolvable into three layers, the upper part of each crowded with, the lower more sparing, of fossils.	6
3. Thin shaly limestone abounding in bryozoa and corals, brachiopods generally crushed and massed together, Orthis being the most prominent	5

Beginning at this quarry and still going westward, within the next four miles is found, at comparatively short distances from each other, no less than six long ravines, each, in its course, contributing something to our knowledge of the rock. This whole ravine region deserves a slight notice. I have called them ravines. In reality they are valleys of erosion two or three hundred feet broad, thirty to fifty feet high, not the result of any forces now in existence. The little streams have simply hunted them up—taken advantage of their work to make the nearest way to the river, doing some excellent work as they passed along. Their apparent origin seems simple. Little rivulets originating back in the prairies running southward, swollen by rains and especially spring freshets, have cut their way through the soil and into the upper part of the shales, have ploughed deeper in their course as they approach the bluff, leaving on their banks for a mile or more masses of rock and shale. The excavation goes on through the long slope stretching towards the river, building a channel for its course. The rock, whether exposed in the ravines, at the bluff, or on the long slopes extending to the river, with one exception, is always that of the Spirifer Pennatus beds. All the quarries that have been opened are in the same beds. Along the crown of the slope occur their most prominent features.

A few rods east of Mr. Sauer's quarry and along its side extends the First Ravine. Though shorter than some of its neighbors, it originates back in the prairie, and along its course for a long distance good exposures of rock and shale may be studied. North of the quarry for thirty or forty feet extend thick, heavy beds of encrinal limestone. They form a sharp contrast with the softer, thinner layers in the quarry,—showing the change occurring in the same rock within such short distance. Between this and the next ravine,

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and at about the same height as the Sauer quarry, a new, large quarry has just been opened on the farm of Mr. J. G. Dutcher.

The section shown is as follows:

	FEET.
1. Irregular layers of shaly limestone slightly fossiliferous.	2
2. Layers still more irregular.	3
3. Thickened strata including three beds of encrinal limestone.	7
4. A slight bluish limestone *in this place* arranged in regular strata each of 6 or 8 inches, forming the floor of the quarry.	6

In all other places this limestone is most irregularly bedded. It is readily recognized, abounding in broken fragments of fossils which are of a darker blue than the rock in which they were imbedded.

One-quarter of a mile west of this quarry, and nearly half a mile from the First Ravine, we find the Second. In many respects it differs from the first. It cuts through the limestone at a lower horizon. It shows not a continuous, regular exposure, but abounds in occasional bluffs attaining a height of fifteen to thirty feet. These challenge attention not only for number or height, but for irregularity in bedding. Strata are laid down sometimes horizontally, but oftener diverging from such rule, often disposed in long, flexuous curves, each bearing only the slightest possible resemblance to its neighbor. To a student interested in abnormally developed strata this locality commends itself.

To add to the perplexity, the same strata change in thickness with every new exposure. Leaving out this element of uncertainty, the section is as follows:

1. First and uppermost is a well-defined *coral reef* showing a thickness of one or two feet.
2. The upper series of limestones and shales especially noted for disturbances in bedding.
3. Encrinal limestone in the mass or distributed in layers.
4. A hard, often softer, calcareous shale filled with brachiopods, Orthis being the prevailing form.
5. Second series of limestones and shales firmer at the bottom of the dry channel.

May it not be owing to the changing, almost abnormal, condition of the strata characterized as No. 2,—that while every step is made over broken fragments of fossils, scarce a perfect form is found?

A quarter of a mile west, on the farm of Mr. William Sauer, is a quarry in the Third Ravine.

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Prof. Hall* recognized the shales and shaly limestone underlying the encrinal limestone, giving a section of fifty or sixty feet as follows:

Encrinal limestone, ...	10—15 feet.
Shales and shaly limestone, ...	50 feet.

Since his visit, resting on the encrinal limestone, a quarry has been opened in the *upper* limestones and shales showing a further height of ten feet. Another addition is effected through the change wrought in the encrinal limestone. As it *here* appears it is a single huge, solid block thirty feet in length and ten to twelve in height, apparently capable of resisting all ordinary elements of change or decay. Yet as we ascend the ravine we find that for nearly a mile the beds and banks of the little stream are strewn with thin layers of the limestone from an inch to two inches in thickness, their surfaces covered with crinoidal columns and occasional well-preserved smaller corals and bryozoa. The fall in the stream for a mile should be taken into account, as it adds further to the height of the rock. The exposure suggests the changing horizons of the three ravines so far noticed. The First cuts into the extreme upper part of the upper limestones and shales. The Second ploughs still deeper into the central portions. The Third finds its way into and through the encrinal limestone. Two peculiar exposures of the upper limestones should not be overlooked. They occur a quarter of a mile west, just above where the little stream running through the Spirifer Parryanus bed crosses the bluff. In its bed, and covering the entire width of the stream for a short distance, is a rock roughened with the remains of large Orthocera and Gomphocera. One of the latter was found in excellent condition. This rock may be the extension of the coral reef referred to before, and best exhibited in the Fourth and Sixth Ravines. One thing is certain: a Gomphoceras of similar size, and in the same relative position, is found in both ravines. A short distance above this rock is found a mass of soft clay abounding in perfect forms of a large Orthis, large and small *Strophedonta demissa*, and, in a higher portion, abundance of Blothrophyllum. It is most probably the only exposure above the encrinal limestone where large brachiopods have been found.

The Fourth Ravine is about one mile east of Buffalo. Prof. Hall found there the same series of beds described in the Third Ravine, with the encrinal limestone at the upper part, having a thickness of fifteen or twenty feet. The knowledge since obtained, and the appar-

* Geology of Iowa, Vol. I., page 86.

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ent confused succession of some of the beds, will justify a passing notice. At the mouth of the creek the thicker beds of the lower limestone and shale, in disturbed condition, extend into the river, appearing in the ravine as scattered huge blocks for some distance, and then taking the form of an extended level bottom-rock, over which the stream flows. On the east side, in the bank, appears the encrinal limestone, gradually thickening and rising as we ascend, until, from beneath, there crops out a long exposure of the shale crowded with broken valves of Orthis and other brachiopods. Opposite, and across the stream, has been opened in the upper limestone and shales a large quarry. Beyond this, over the whole width of the stream — covering several yards — a stratum made up of Spirifer Parryanus rests partially on the encrinal limestone, and another and higher stratum on the coral reef. There is here no doubt of its position or contents. The *Acervularia davidsoni* is prominent and the roughened calices of *Cystiphyllum americanum* lay almost parallel side by side.

The section here is as follows:

	FEET.
1. Coral reef, ...	½
2. Upper limestones and shales.	10
3. Encrinal limestone.	12
4. The Orthis beds.	6
5. Thick lower limestones and shales.	8

East of the mouth of the stream, on the river bank facing it, is an unusually interesting exposure extending half a mile. 3 and 4 of the above section is well exposed.

The Fifth Ravine, through which Cedar Creek flows, lies west of Buffalo, in the edge of the village, the quarry of Captain Clarke being its most noticeable feature. We call attention to some of its peculiarities: In approaching it from the river, the lower limestones are firmer than elsewhere, even the shales sharing in the same characteristic. When they carry fossils it is difficult to detach them from the matrix. The upper limestones at the falls are extremely heavy bedded and firm. In this quarry have been found the greater part of the Crinoidea and Blastoidea of the Spirifer Pennatus beds. Prof. Ulrich gathered here most of the bryozoa described and figured in the Eighth Volume of the Illinois Geological Survey. Above the falls, in the edge of the village, appears a rock differing from any other member of the series, cropping out on the banks of the stream for half a mile. It is in regular beds of four to six inches and attaining a thickness of

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three or four feet. Its buff color suggests the Parryanus beds, but among the few thin, broken fragments of shells we scarce recognize any species from those beds. It abounds, however, in what seems to be the *Cystodictya hamiltonensis* of Ulrich; if not, a larger form of the same genus. Placing this rock, which is most probably local, at the head of the series, we have this section:

	FEET.
1. Buff limestone regularly bedded.	3
2. Upper limestones and shales, irregularly stratified on either side of the falls.	10
3. Crinoidal strata varying from two to six inches in thickness.	6
4. Orthis bed including here some other forms.	4
5. Crinoidal bed at base of quarry, in which most of the Crinoidea occur.	3
6. Lower limestone and shales extending in huge generally detached blocks to the river.	

The levee in front of the village is made up of the lower members of the series. Taken together they present a greater thickness of *horizontal* strata than is found elsewhere. The best-preserved larger fossils of the Spirifer Pennatus beds have been found here.

The Sixth Ravine occurs one mile and a half below the village. Stevenson's Creek flows through the bottom-land to the river, and at its mouth the upper limestone appears as an extended, hard, solitary mass detached from its ordinary surroundings. One mile further north, directly under the Spirifer Parryanus beds, and accompanying them for some distance, with a thickness of little over two feet, is the coral reef. Its surface is covered with many roughened coralline forms. Prominent among these are the *Acervularia davidsoni* and *Cystiphyllum americanum*, as in the Fourth Ravine. With greater extent of the reef, they are in greater abundance. Half a mile further north is found an extension of the same strata, containing the same fossil forms, in a similar position at the base of the Spirifer Parryanus beds. The fossils of these beds are, for convenience of reference, arranged in three classes.

1.—The more common forms:

Acervularia davidsoni.....Hall.
Alveolites goldfussi.....Billings.
Astræospongia hamiltonensis.....Meek & Worthen.
Atrypa aspera, var. occidentalis.. ...Hall.
Atrypa reticularis.....Linnæus.

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Aulopora serpens.....Goldfuss.
Chonetes scitula.....Hall.
Coenostroma pustuliferum.....Winchell.
Crania crenistria.....Hall.
Crania hamiltoniae.....Hall.
Cystiphyllum americanum.....Edwards & Haime.
Crepidophyllum archiachi.....Billings.
Cryptonella planirostra.....Hall.
Cyrtina hamiltonensis.....Hall.
Cyrtina triquetra.....Hall.
Favosites hamiltonensis.....Rominger.
Megistocrinus latus.....Hall.
Monticulipora monticula.....White.
Orthis iowensis.....Hall.
Phacops rana.....Green.
Platyceras ventricosum.....Conrad.
Platyostoma lineatum.....Conrad.
Productella spinulicosta.....Hall.
Productella subalata.....Hall.
Spirifer asper.....Hall.
Spirifer pennatus.....Hall.
Spirifer perextensus.....Meek & Worthen.
Spirifer subattenuatus.....Hall.
Striatopora iowensis.....Owen.
Stropheodonta demissa.....Conrad.
*Stropheodonta nacrea**.....Hall.
Stropheodonta perplana†.....Conrad.
Stropheodonta plicata.....Hall.
Strophomena chemungensis‡.....Conrad.
Var. arctostriata.....Hall.
Terebratula lincklaeni.....Hall.

2.—A list of the rarer forms:

Aulacophyllum sulcatum.....Edwards & Haime.
Ariculopecten princeps.....Conrad.

* *Pholidostrophia nacrea*. Eleventh Annual Report of N. Y. State Geologist, page 281, plate 14, figs. 11–13.

† *Leptostrophia perplana*. Eleventh Annual Report of New York State Geologist, page 281, plate 15, figs. 1–4.

‡ *Orthothetes chemungensis*. Eleventh Annual Report of New York State Geologist, page 284, plate 16, fig. 9.

Orthothetes arctostriata. Thirteenth Annual Report of N. Y. State Geologist, Vol. I., Geology, page 134, *et seq*.

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Bellerophon bowmani.....White.
Botryllopora socialis.....Nicholson.
Cystodictya hamiltonensis.....Ulrich.
Dalmanites boothi, var. calliteles....Green.
Dalmanites (*Crypheus*) *barrisi*.....Hall.
Dendropora proboscidialis.....Rominger.
Elæacrinus elegans. .....Hall.
Elæacrinus meloniformis.....Barris.
Elæacrinus obovatus .....Barris.
Fenestrapora occidentalis.....Ulrich.
Fistulipora collina.....Ulrich.
Fistulipora monticulata.....Ulrich.
Goniophora hamiltonensis (?).....Hall.
Gyroceras constrictum .....Meek & Worthen.
Heteroschisma gracilis.....Wachsmuth & Springer.
Liopteria sayi.....Hall.
Pholidops hamiltonensis.....Hall.
Proetus occidens.....Hall.
Spirifer inutilis.....Hall.
Semicoscinium rhombicum.....Ulrich.
Strombodes johannis.....Hall & Whitfield.
Taxocrinus nuntius.....Hall.
Taxocrinus gracilis.....Meek & Worthen.
Terebratula iowensis.....Calvin.

3.—A list of fossils as yet undetermined:

Among these are found Aviculopecten, Blothrophyllum, Calceocrinus, Crania, Cyrtoceras, Dentalium, Elæacrinus, Gyroceras, Gomphoceras, Loxonema, Mytilarca, Machrocheilus, Murchisonia, Orbiculoidea, Orthoceras, Pleurotomaria, Tentaculites, and Spirorbis.

While some of these are not in good condition, only in shape indicating the genus to which they belong, others are well preserved and warrant further study. The author had hoped to accompany the present paper with another containing "Palaeontological Notes and Descriptions of New Fossils."

The lists given throughout this paper represent individuals found in this vicinity and now in one of the three collections before referred to.

THE SPIRIFER PARRYANUS BEDS.

These beds, when fully represented in this vicinity, are composed in their upper portion of layers of heavy-bedded light-colored non-

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fossiliferous limestones. These are succeeded by shales and shaly limestone which, through their whole thickness, are made up of masses of fossils, mainly of the *Athyris vittata*. These are again followed by limestones resembling those in the upper portion, but more firm and carrying some of the usual fossils.

The contrast with the Spirifer Pennatus beds is very marked. There are no alternations of light-colored limestones and shales, encrinal limestones or coral reefs. These have disappeared. Another series succeeds, in many respects widely different. The general construction is heavy, massive. Thin layers of rock are not indulged in. The shale is like no other shale. It is in full sympathy with the surroundings. There is nothing light or cheery about it. The mode of deposition favors no such idea. And then comes in the color—drab, uniform, persistent to the very last.

There are no Corals, Crinoids, Gasteropods, Cephalopods, or Crustacea. Brachiopods alone survive, their number greatly diminished. Of these Prof. Calvin has furnished the following complete list:

Spirifer parryanus.....Hall.
Spirifer asper.....Hall.
Athyris vittata.....Hall.
Cyrtina umbonata.....Hall.
Atrypa reticularis.....Linnæus.
Terebratula.....Undescribed.
Strophodonta.....Undescribed.

To these none have been added since his publication. No exposure of these beds occurs through the distance of seven or eight miles below the city. They are then found in the First Ravine, over half a mile north of the bluff. A small hillock stands in the very midst of the stream, made up of the buff limestones and accompanying shales, the latter filled with the usual smaller fossils. Within a short distance two or three other patches appear. Another equally limited exposure is seen in the Second Ravine, and about the same distance from the bluff. Fossils had been found in the bed of the stream from time to time, but no trace of their origin, until very lately. A little rivulet had found its way down from the top of the hill, hewing into the shales and limestones of the Spirifer Pennatus beds until a succession of steps of unequal thickness was formed extending down to the main stream. On mounting these, at the very summit appeared for the first time the

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coral reef, and resting on it both the limestones and shales of the Spirfer Parryanus beds, almost lost under the soil of the prairie.

In the First Ravine the beds appeared in the bottom of the stream. In this, they were only reached by a lengthy, tortuous route, and found at the top of the hill from thirty to forty feet above the stream.

The Third Ravine contains no exposures, but following a road west of William Sauer's quarry nearly a quarter of a mile, a little stream is encountered crossing the bluff, in two particulars differing from any of the others we have noticed. It runs in an entirely different direction. They from north to south to the river, this from west to east, making a sharp angle to cross the bluff. It is the only stream whose whole course lies through the Spirifer Parryanus beds. For a quarter of a mile exposures are frequent both in rock and shale. First appear large, heavy, extended blocks detached from the bluff, usually sparing of fossils. As we ascend the shales come into view. The channels cut by the stream are unusually deep and crowded throughout the entire depth with masses of broken shells of, mainly, *Athyrus vittata*. Beyond these the hardened limestone is again seen till lost in the prairie. The following section is given:

	FEET.
Thick, heavy bedded limestone.	4
Shales, excessively fossiliferous.	5
Lower harder limestone.	3

In the Fourth Ravine, generally known as the "Dodge Ravine," is a remarkable exposure of these beds just north of the large quarry in the Spirifer Pennatus beds. The encrinal limestone here attained its utmost hardness and forms for some distance the smooth floor over which the stream flows. Its width is forty or fifty feet and across it had extended two or three strata of limestone a few inches in thickness, filled with the casts of Spirifer Parryanus. The action of the water had broken away all the central portions, leaving on both sides of the stream projecting towards it these differing strata. The crowded condition of the shells, their number, their exclusion of every other form, calls to mind the description given by Prof. Calvin of casts of the same Spirifer as found at Montpelier in a slightly differing rock.* The locality has been worked by visitors who would naturally suppose it to have been in the Spirifer Pennatus beds. Certain peculiarities would favor such conclusion. The appearance of the Spirifer in such

*Geology of Iowa, Vol. I., page 45.

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numbers is unheralded by any *apparent* change in the rock. They are also unaccompanied by their usually associated fossils.

The hardened rock of the Spirifer Parryanus beds rests first upon the encrinal limsestone, and when that disappears, on the coral reef. A short distance beyond this, and for the first time in the banks of the stream, are seen thick, heavy strata assuming very gradually something of the usual characteristics of the beds even as to color, the whole still very sparing of fossils. In the bed of the stream for a long distance, in the matter of form, color, and hardness, the limestone seems assimilated to the rock on which it rests. The upper member, heavy bedded, buff-colored, is seen in place half a mile distant, resting on the hardened layers of the shales, which, though crowded with the smaller fossils, yet refuses to release them from their matrix, owing to the extreme hardness of the material in which they were embedded.

In the Fifth Ravine, where Captain Clarke's quarry is located, is a comparatively limited exposure occurring on the east side of the Falls. Huge blocks have been detached from their place in the bluffs, falling down and standing on edge. Some of these measure several feet across and are two or three feet thick, showing the usual smaller fossils. The lower portion extends in a perpendicular face to the quarry in the lower beds. Above these Falls are a few scattered rocks, but there is no further extension of the rock northward.

The Sixth Ravine, one mile and a half below Buffalo in the banks of the streem and one mile above its mouth, presents an interesting exposure. The Spirifer Parryanus beds assumes something of its typical form. The upper portion is buff-colored and heavy bedded, almost non-fossiliferous, with a height of five feet. The middle portion is composed of the softer clays and shales filled with the ordinary fossils, and is about five feet in thickness. The lower part maintains its ordinary features for two or three feet till it approaches the stream, when, in direct contact with the underlying rock, it gradually becomes firmer and finally assumes the color and hardness of the coral reef. Just as in the Fourth Ravine, a similar change was wrought in the lower portion of the Spirifer Parryanus beds in contact with the encrinal limestone. One-half mile further north, on the east side of the stream, the shales and shaly limestones are again seen prolific in fossils, while the lower portions rest on the coral reef conforming to its color and hardness.

SUMMARY AND CONCLUSION.

The Phragmoceras beds first recognized in the eastern part of the

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city are exposed on both sides of the river, culminating in thickness and interest in the Cook and neighboring quarries, and disappearing a short distance below. They are of comparatively limited extent, confined within two or three miles and reaching a height of about twelve feet. They contain characteristic fossils to the number of twenty-four. Eight pass into the beds above, while about the same number are undetermined.

The Spirifer Pennatus beds appearing in the old LeClaire quarry are seen on both sides of the river and are in full force throughout the Ravine region, disappearing for a time with the exposure in the Sixth Ravine. Of greater extent than either of the other beds, they appear through the distance of eleven or twelve miles and in height range from sixty to seventy feet. About sixty species of fossils have been found in these beds, while but one of them is represented in the succeeding beds and eighteen are undetermined.

The Spirifer Parryanus beds are not found through the distance of seven or eight miles below the city, and then only in patches in the First and Second Ravines. They are well exposed on the little stream between the Third and Fourth Ravines, carrying all their peculiar characteristics into the Sixth Ravine, beyond which they soon disappear. Their extent is about four miles, their height from twelve to fifteen feet. Described fossils are limited to five, while two are undetermined.

As to the place of these beds in the Geological formations of the state, it will be remembered that the Devonian of the State of New York embraced four large Geological formations. It was natural to suppose that in its extension westward some of these formations would again appear. As early as the Second Geological Survey, Prof. White took the ground that all the Devonian strata of Iowa evidently belonged to a single epoch, undoubtedly referable to the Hamilton period, as recognized by the New York geologists.* After long, patient study, Prof. Calvin came to the same conclusion. As one of the results of his labors he separated all the calcareous beds of the Iowa Devonian into three divisions. The first he named the Lime Creek Shales, the second the Cedar Valley Limestone, the third the Independence Shales.

It is to the middle division, "the great limestone series," that the beds described in this paper belong. The writer has directed attention simply to a study of its most easterly outcrops, trusting his work may be of some use to the student in his geological studies.

* Geology of Iowa, White, Vol. I., page 187.

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The subject thus presented suggests the fault of former papers on "Our Local Geology," in referring the lower beds to the Corniferous limestone. It consisted in emphasizing certain conditions as peculiar to the Phragmoceras beds, when, as we have shown by comparison of bed with bed, it is found that conditions equally characteristic distinguished the other two. Unity is thus reached, not diversity. The very differentiation of these beds as to lithologic and palæontologic character, instead of separating, binds them together as parts of one Geological formation. In keeping with such relationship is the fact that one-third of the fossils of the Phragmoceras beds pass up into the Spirifer Pennatus beds, suggesting another bond of union. In the list given how few fossils can be recognized as positively characteristic of the Corniferous limestone.

Further, and establishing the true relationship of these beds to each other, is the significant fact that there are no signs of disturbance between the Phragmoceras and the Spirifer Pennatus beds that would suggest a separation. Despite a single apparent exception, and that at the summit of the Spirifer Pennatus beds, the same continuity of rock deposition is maintained throughout the whole series.

Efforts have been made from time to time to correlate the whole or parts of the Iowa Devonian limestone with the whole or parts of the New York Devonian, but have not proved entirely satisfactory. The incorporation of the following remarks of McGee into the first volume of the Iowa Geological Survey by Prof. Keyes, then Assistant State Geologist, no doubt voices the opinion of the Chief of the Survey, and its reproduction here may well close the present paper.*

"It is therefore manifestly unwise to correlate either the limestones alone or the entire series of Devonian strata with any of the New York divisions; and while the shales may be discriminated on both lithologic and palæontologic grounds, it is not now possible (and perhaps it never will be possible) to separate the limestone series into distinct formations or into individualized beds of more than local value. They may accordingly be treated as a unit and may take an individual name; and it seems expedient to recur to the designation originally proposed by Owen, and re-christen the entire series of Calcareous sediments stretching from the Minnesota line to Muscatine County in a belt fifty miles in average width, the *Cedar Valley Limestone*."

* U. S. Geol. Surv., 11th An. Rept., page 319.
Iowa Geol. Surv., Vol. I., page 39.

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A STUDY OF A CENSUS OF THE PUEBLO OF COCHITI, NEW MEXICO.

BY FREDERICK STARR.

FOR some time it has seemed to the writer that the quickest and simplest method of getting at the fundamental facts in the social organization of any one of our Indian tribes would be the taking of a census of the whole population by houses, securing the clan of each person and his relationship to the other members in the household. In making general inquiry of Indians regarding clans or the structure of society some details are almost sure to be missed; with such a census, properly made, no point can finally be overlooked. It has been believed, also, that such a census would be useful material to place in the hands of a class of students for study. Impelled by these two ideas, we made a house census of the Pueblo of Cochiti, N. M., on our last visit there in September.

The structure considered typical of most American tribes may be briefly stated. Two ideas are fundamental—the importance of blood kinship and the supremacy of woman in the household. The tribe is made up of a certain number of clans, gentes, or kins, whose members are blood relatives and bear the clan name; relationships are traced through the woman, and children belong to the clan of the mother; the father is of another clan, as marriage between members of one clan is prohibited.

In 1890 Bandelier* stated that at Cochiti there were "at least thirteen clans," the names of which he gave as follows: Sun, water, cottonwood, turquoise, panther, bear, calabash, mexican sage, coyote, corn, scrub-oak, fire, ivy. It is plain that Bandelier cannot have made a detailed census, such as is above suggested. This will appear presently.

The census of Cochiti on September 28, 1897, follows:

NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
1.	Santiago Quintana.....	Pā-wī-tē.....	Tanyi.	
2.	*Sefarina Garcia. f.....	Shrā-kī-mī	Hapani.	
3.	Estafana Quintana. f.....	Shwī-tī-ŭtz.....	Hapani.	
4.	Maria Vittoria Quintana. f.	Tsā-mŭ-ī-ŭtz....	Hapani..	"Tassel of Corn."

* Papers Archæological Institute of America, American Series, Vol. III., p. 273.

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
5.	Pablito Quintana.....	Wā-pō-ñī.....	Hapani...	"Sea Shell."
6.	José Domingo Quintana...	Shrā-kū.....	Hapani...	"Out of the North."
7.	M. Cresenciana Quintana.f.		Hapani.	
8.	M. Cecilia Quintana. f.....	Stī-ēr-ŭ-pai-mŭ	Hapani...	"The entire field."
9.	Francisco Quintana.....	Hau-wī-yī-nŭ.	Tzitz.....	"Cornstalk." Husband of No. 3.
10.	Demasio Quintana	Kō-rai-tī-wā ..	Hapani...	Son of 9 and 3.
11.	José Samuel Quintana.	Ō-mā-tī-wā...	Hapani...	Son of 9 and 3.
12.	Santiago Quintana.....	Ā-rā-hō-mā...	Hapani...	Son of 9 and 3.
13.	Juanito Chavez.....	Hĭtz-tī-wā	Hitraani..	"Blue Jay." Husband of No. 4.
14.	Maria Graviolita Chavez. f.		Hapani...	Daughter of 13 and 4.
15.	José Domingo Chavez....	Hī-ōrsh-kō-mŭ. tī-wā.	Tzutsuna..	"Corncob."
16.	*Juanita Semilla. f.....	Hī-ārst-ŭtz....	Huashpa..	"Dawn."
17.	M. Cension Chavez. f.....	Yā-tsī-rī.....	Huashpa.	
18.	M. Anna Chavez. f.....	Hā-wē-rīn-ŭtz.	Huashpa..	"Plants."
19.	Juan de Jesus Patagordo...	Yē-mā	Oshatch.	
20.	Juan Ysidro Chavez.....	Shrā-yō-tī-wā..	Isi.	
21.	*M. Laurencita Romero. f.	Shrā-rā-tī-yā-ñi	Hitraani.	
22.	José Maria Quintana.....	Hā-kā-yā-tī-wā	Shoame...	A yellow bird.
23.	*Dominga Herrera. f.....	Hī-wŭtz.....	Isi.	
24.	M. Trinidad Melchoir. f...	Shrā-nī-yā	Hitraani..	Wid. of son of No. 22.
25.	Dominga Quintana. f.....	Shrīt-yai-yā...	Hitraani..	Daughter of No. 24.
26.	Andrea Quintana. f.		Hitraani..	Daughter of No. 24.
27.	Santiago Cordero.....	Kaī-wī-ä-tī-wā.	Tanyi.	
28.	*Juana M. Matalova. f....	Kā-yī-yā-ña...	Shipewe.	
29.	Ventura Cordero.....	Pai-ī-nā.....	Shoame...	Son of 27 by former wife
30.	Manuel Cordero.....	Ai-rō-tī-wā....	Shoame...	Son of 27 by former wife
31.	Anastasio Cordero.....	Mō-shātsh	Isi.	"Buffalo." Son of 30, who is a widower.
32.	Manuel Melchoir.....	Shrā-wē-dē.. .	Shoame.	
33.	*Candelaria Arcera. f.....	K'ā-wī-tī-ā....	Hitraani.	
34.	Santiago Quintana.....	Kā-ō-tī-wā....	Hitraani..	Son 33 by former hus'd.
35.	Pifanio Melchoir.....	Kē-chā-wŭ....	Hitraani..	"To go running." Son of 32 and 33.
36.	Madelina Suina. f.....	Ē-hā-rī-tzŭ....	Tanyi	Wife of 34.
37.	f.		Tanyi	Daughter of 34 and 36.

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
38.	Santiago Quintana		Isi.....	Adopted son of 34.
39.	José Maria Chee.....	Daĭ-kū-ñĕ.....	Hitraani.	
40.	*Manuela Mokina. f.....	A-tĕ-mĭ	Huashpa..	She has many children: some live outside. Now with fourth husband.
41.	Juanito Trujillo.....	Kĭ-yā-rai-ĕ-ti-wa.	Huashpa.	
42.	Taniclauo Trujillo.....	Tsā-tĭ-yŭ	Huashpa..	"Out in the hills."
43.	Rosendo Trujillo.....	Shrau-tĭ-ĕ-tĭ-wā.	Huashpa..	"Sprouting."
44.	Antonio Melchoir.....	Shrō-yai-yot-ñĭ.	Shoame..	
45.	*Rita Venadita. f.....	Sō-rō-pa.....	Hitraani.	
46.	Guadalupe Romero.....	Shō-wai-ă-tĭ-wā.	Oshatch..	Cacique of the village.
47.	*M. Matiana Akaka. f....	Tsĭ-ō-tĕ.....	Hitraani.	
48.	Adelaido Montoya.		Hitraani..	Son-in-law of No. 46.
49	*Losijita Romero. f.....	Tsē-tĭ-mĕ.....	Hitraani..	Daughter of 46 and 47.
50.	José Francisco Montoya...	Hĭ-ă-ĭ-tĭ-wā...	Hitraani..	Son of sister of 48. The mother lives, but presented boy to her brother.
51.	f...		Hitraani..	Daughter of 48 and 49.
52.	M. San Juana Quintana. f..	Shĭ-wĭ-ă-ña...	Isi.....	Widow.
53.	Marcial Quintana	Kō-tsā	Isi.....	Name of a hawk species. Son of 52.
54.	Nepomoseno Quintana....	Wā-kā-nē.....	Isi.....	"Rush" or "Cane." Son of 52.
55.	Francisco Quintana.....	Kā-rŭ.....	Isi.....	"The rose of Castile." Son of 52.
56.	Cipriano Quintana.....	Ō-shā-tĭ-wā...	Isi.....	"Sun."
57.	*Maria Rosaria Arcera. f..	Shrai-wĭ-ŭtz...	Shipewe.	
58.	Juan de Jesus Pancho.....	Hai-ō-wē.....	Hitraani..	Married outside of tribe.
59.	Tonio Suina.....	Tsĭr-tĭ-ă-tĭ-wā.	Tsutsuna.	
60.	* f.....	Pō-rā-kā.....	Hapani...	"Dove."
61.	Juanito Suina.....	Kā-ō-mā-tĭ-wā.	?	Son 59 and former wife.
62.	f.....		Hapani...	Daughter of 59 and 60.
63.	f.....		Hapani...	Daughter of 59 and 60.
64.	Ventura Lucero.....	Kā-tzō-mā....	Shipewe..	"When men begin life."
65.	*Candelaria Urbana. f.....	K'ĕ-nā-tê-dzŭ.	Tzutsuna.	
66.	f.....		Tzutsuna..	Daughter of 64 and 65.
67.	Chavez Trujillo.....	Tsĭ-wĭ-tĭ-wā...	Oshatch..	
68.	*Margarita Chavez Pancho.f.	Kĭ-yai-tĭ-ă-ñū.	Huashpa.	
69.	Florenzio Trujillo.....	Kĭ-tĭ-wā.....	Tzutsuna..	Son of 67 by former wife.
70.	Juan José Trujillo.....	Ă-sō-nā	Tzutsuna..	"Swelling maize."

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
71.	Carolina Trujillo. f.....	Ai-ō-ŭtz.....	Tzutsuna..	Daughter of 67 by former wife.
72.	Mariano Chavez.....		Isi.	
73.	*Lopita Archevequef....	Kwī-nŭ-tĕ	Isi.	
74.	Francisco Chavez.....	Shī-kĕt	Isi.	"Star."
75.		Pō-rai-ti-wā...	Isi.	
76.	Tobias Chavez.....	Wā-tī-wā.....	Isi.	
77.	f. ?...	Hō-ō-kā.....	Isi.	
78.	Manuel Nambe.....	Kai-kē-ĕ-tī-wā.	Huashpa.	
79.	*Teresita Moradas. f.....	Ā-hwā-nŭ-tzŭ..	Hitraani.	
80.	f.....	Shau-wā-kĕ-rē.	Hitraani.	
81.	f....		Hitraani.	
82.	Salvador Montoya.....	Tsĕr-tshrō-yā..	Shipewe.	
83.	*Lorenzita Chee. f.....	Tshrā-wā-tĕa..	Isi.	
84.	Santiago Montoya.....	Tsā-yā	Isi.	
85.	Vittoria Montoya. f.....	Tshrau-ī-tĕ-rā-tzŭ	Isi.	
86.		Kā-nŭ-rŭ	Isi.....	Name of a bird.
87.	M. Velina Montoya. f....	Kau-yō-tĕ.....	Isi.	
88.	Victoriano Herrera.....	Rō-tī-ā-nā	Isi.	
89.	*M. Ignacia Archeveque. f.	Kī-ātz-īmĕ....	Isi.	
90.	Torivio Herrera.....	Wai-tĕr-ā-ña ..	Isi.	
91.	Lorenzo Herrera.....	Tsĕ-kī-ŭt-yĕ...	Isi.	
92.	M. Miguela Herrera. f...	Kā-tsī-ā.....	Isi.	
93.		Tsi-rī-ā-tī-wā..	Isi.	
94.	Juan Cordero.....	Shrau-wī-tī-ñī..	Tanyi.	
95	*Savelita Akaka. f.....	Shī-wā-ŭtz....	Huashpa.	
96.	f.		Huashpa.	
97.	Toñi Calabasa	Tzī-i-nŭ-tē....	Shipewe..	"Cloudy."
98.	*M. Louisa Trujillo. f....	Kwī-ŭtz.....	Huashpa.	
99.	f....		Huashpa.	
100.	José Maria Naranjo.....	Ī-ō-ĕ-tī-wā....	Hapani...	"Wind blowing."
101.	*M. Cresencia Perez. f...	Shrai-ō-wŭtz ..	Isi.	
102.	Mariano Naranjo.....	Kai-ō-wē	Isi.....	"Dawn."
103.	Provencio Naranjo.....	Kū-ō.....	Isi.....	"Otter."
104.	Tomas Suina.....	Ai-ō-wī-tī-wā..	Hapani.	
105.	*Bartola Chavez. f.....	Hā-yō-mŭ-tsŭ .	Hitraani.	

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NO.	NAME : SPANISH.	NAME : INDIAN.	CLAN.	REMARKS.
106.	Lorenzo Herrera.....	Kō-wa-ñī.....	Isi.....	"Lake."
107.	*Seferina Arcera. f.....	Tsī-stī-ŭts.....	Hitraani..	"Praise god."
108.	Juanito Herrera.....	Hā-kē-ā-ti-wa.	Hitraani..	Son 107 by a dead hus.
109.		Kō-rā-ñī.....	Hitraani..	Son of 106 and 107.
110.			Hitraani..	Son of 106 and 107.
111.	Todocio Cordero.....	Ī-ārsh-kĕ-ti-wā.	Yakka....	"Ray of the sun."
112.	*Juanita Padia. f.....	Hā-ā-tī-ŭtz....	Shipewe.	
113.	Vitoriano Cordero.....	Īk-ā-ñī.....	Shipewe.	
114.	Isidro Cordero.....	Wā-kō-rō.....	Shipewe..	Name of a plant.
115.	José Trujillo.....	Tōn-hī-vē	Shipewe..	Grandson of 112: mother dead.
116.	Florencia Trujillo. f.....	Kwī-rai-nā....	Shipewe..	Sister of 115 and 117.
117.	Tonita Trujillo. f.....		Shipewe..	Sister of 115 and 116.
118.	Marcelina Herrera. f.....	Ha-tī-ā.....	Huashpa..	"Mountain cottonwood."
119.	Demasio Herrera.....	Hī-ā-ē-rā.....	Huashpa..	"The road." Son of 118
120.	Victor Suina.....	Tsī-ō-tsī-tī-wā..	Huashpa.	
121.	*Lopita Cordera. f.....	Kai-shrai-ā....	Tanyi....	Sister of 94.
122.	Lorenzo Suina.....	Mā-hī-ō.....	Tanyi....	"Springing maize."
123.		Hwē-wā-nā...	Tanyi....	
124.		Schrā-ā-ñī	Tanyi....	
125.	Rosinda Cordero. f.....	Tsĕ-kai-yŭ....	Shipewe..	Wife of 122.
126.		f. Hai-kyū-wŭtz..	Shipewe..	Daughter of 122–125.
127.	Juanito Herrera.....	Tsā-ī-wī.....	Hitraani.	
128.	*Juanita Herrera. f.....	Shrā-ā-tī-ā....	Huashpa.	
129.	Mariano Herrera. f.....	Kā-au-tī-mĕ...	Huashpa..	"The sower."
130.		f. Kā-āsh-pā.....	Huashpa..	"Dancing girdle." Child of dead daughter of 128.
131.	Manuel Ortiz.....	Tsī-wī-sī-rō ...	Tanyi.	
132.	Raphael Antonio Ortiz...	Tī-mī-kā.....	Tanyi....	Brother of 131.
133.	Kerina Chalana. f.....	Shrai-ō-wŭtz...	Tzitz	Wife of 131.
134.	Juanita Quintana. f.....	Hrā-nī-kŭ	Shoame.	
135.	Francisco Ortiz.....	Ī-ē-ī-tī-wā,....	Shoame...	Son of 134.
136.	Ventura Ortiz.....	K'ā-ī-ā-tī-wā..	Shoame...	Son of 134.
137.	M. Vitoria Ortiz. f.....	Tsī-ū-tī-ŭtz ...	Shoame...	Daughter of 134.
138.	Luis Ortiz.....	Tsī-ū-kā.....	Shoame...	Child of 134.
139.		f.	Shoame...	Daughter of 134.
140.		f.	Shoame...	Daughter of 134.

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NO.	NAME : SPANISH.	NAME : INDIAN.	CLAN.	REMARKS.
141.		f.	Shoame...	Daughter of 134.
142.	Santiago Akaka.....	Ĭ-wĭ-yä-ñĭ.....	Hitraani.	
143.		Ä-yō-lĭs.....	Huashpa..	Son of 142.
144.		Tsĭn-ä-tĭ-wä...	Huashpa..	"Turkey." Son 142.
145.	Antonio Challan.....	K'ä-tĭ-ä.....	Hitraani.	
146.	*Juanita Perez. f.....	Shrai-ō-ĭ-tsŭ...	Tzitz.	
147.		f. Tsai-ō-wĭ-tsŭ..	Tzitz.	
148.		f. Tō-ōtch.....	Tzitz.	
149.		f.	Tzitz.	
150.	M. Gilia Arcera. f.....		Hitraani..	Widow.
151.		Tō-rä-ñĭ.....	Hitraani..	Son of 150.
152.		Bō-nĭ-ä.....	Hitraani..	"The west." Son 150.
153.	Juan Arcero.....	Wai-tĭ-yä.....	Hitraani.	
154.	*Inez Mokina. f.....	Kä-ĕt-ŭtz.....	Huashpa.	
155.	Cleito Arcero.....		Huashpa.	
156.	Clovis Arcero.....	Maish-ti-wa...	Huashpa.	
157.	Reyes Melchoir. f.....	Kĭ-äñ-ĭ-ŭtz....	Shoame...	"Deer."
158.	Lociyita Ortiz .f.....	Sĭ-yät.....	Hapani.	
159.	Juanita Arcera. f.....	Sĭ-shrä-ya.....	Hapani...	"The name." Daughter of No. 158.
160.	Mariana Arcera. f.....	Mä-ä-pēs.....	Hapani...	Name of a Mexican bird, Daughter of 158.
161.		f.	Hapani...	Daughter of 158.
162.		f.	Hapani...	Daughter of 159.
163.	Natividad Arcero.....	Kĭ-ä-mĭ-tĭ-wä..	Hapani...	"Eagle."
164.	*Juanita Chavez. f.....	Kō-tĭ-mĭ-ñē...	Hitrani.	
165.		f. Mĭ-trai-yä.....	Hitraani..	Daughter of 163–164.
166.		f. Hä-wai-ŭtz....	Hitraani.	
167.			Hapani...	Son of an outsider.
168.	José Francisco Pancho...	Tsai-ya-ĭ-tĭ-wä.	Hitraani.	
169.	*Reyes Urbana. f.....	Shrä-ĭ-mŭtz...	Hapani.	
170.	Juanito Pancho.....	Tsĭ-kō-ra.....	Hapani.	
171.		f. Tsaĭ-tsĭ-ŭtz,...	Hapani...	Now at Sandia.
172.	Juan Pedro Melchoir....	Shwē-yä-tĭ-wä.	Hitraani.	
173.	*Ignacia Montoya. f.....	Shrai-kĭ-wĭ-ŭtz.	Hitraani.	
174.		Shpä-ä-tĭ.....	Hitraani.	
175.	Pablo Melchoir.....	Kwĭ-ya-tĭ-wä..	Hitraani.	

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
176.	Serafine Quintana.....	Shkō-rō-tī-wā..	Shoame...	Widower.
177.	Petra Quintana. f.....	Shrā-yō-ri-ŭtz .	Tzutsuna..	Daughter of 176.
178.	Dominga Quintana. f....	Kā-yō-tīts	Tzutsuna..	"Singing." Dau. 176.
179.		f.	Tzutsuna..	Daughter of 177.
180.			Tzutsuna..	Son of 177.
181.			Tzutsuna..	Son of 177.
182.	Rafaelito Calabaza.....	Hā-trū-tsĕ....	Shipewe...	"Man."
183.	*Cecilia Arcera. f.....	Kī-wä-tīt.....	Shoame.	
184.	M. Domiguita Chavez. f..	Tō-gō-ñe.....	Shoame...	Daughter of 183.
185.		Kī-ā-tē-rā-ñŭ..	Shoame...	Son of 183.
186.			Shoame...	Son of daughter of 183.
187.	Louisa Romera. f.....	Kā-ā-yōkŭ....	Shoame.	
188.	Luis Romero.....	Mō-kā-ātch ...	Shipewe ..	Son of brother of 187.
189.	Santiago Romero.....	Kī-ai-shrō-tē ..	Shipewe..	Son of brother of 187.
190.		f. Kā-chī-ŭtz....	Shipewe ..	"Falling rain." Daughter of the brother of 187.
191.	Santiago Arcero.....	Tsī-yō-tī-tī-wa.	Hitraani.	
192.	*M. Merced Montoya. f.	Shkī-yār-ŭtz...	Huashpa.	
193.		Shro-ñī-ā.....	Huashpa.	
194.		f.	Huashpa.	
195.	Natividad Arcero.....	Shwī-yā-rī	Shoame.	
196.*	Toñita Montoya. f.....	Shi-wī-yā-nĕ ..	Tzutsuna.	
197.	Stephana Arcera. f.....	Hā-nī-ŭtz.....	Tzutsuna.	
198.	Pomosena Suina.....	Tsī-ō-wī-tī-wa.	Hapani.	
199.	*Rofina Chavez. f.....	Tsī-ō-kōsh....	Isi.	
200.	Juan José Suina.....	Koi-ā-shtō-lō..	Isi.	
201.		f. Shī-tī-yā.....	Isi.	
202.	Juan Isidro Trujillo.....	Sī-rō-nī	Oshatch.	
203.	*Lorenzita Arcera.. f.....	Kai-yā-ŭtz....	Tzitz.	
204.		f.	Tzitz.....	Daughter of 203.
205.		f.	Tzitz	Daughter of 202 and 203
206.	Vicente Arcero.....	Hi-shi-tī-wā...	Tzitz.	
207.	*Inez Ortiz. f.....	Kō-ī-nŭtz.....	Shoame.	
208.		f. Tsŭr-tskī-yŭ...	Shoame...	"Flower of the Calabash."
209.	Santiago Cordero	Tsī-ō-tĕ-tī-wā..	Yakke.	
210.	M. Pereseliana Cordera. f.	Tsī-kai-ŭtz....	Tzitz.....	Daughter of 209.

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
211.	Juan Rosario Quintana	Tsī-wā-tĕ	Shoame.	
212.	*Anna Suina. f.	Kai-wī-ŭtz	Huashpa.	
213.	Miguela Quintana. f.	Shrā-tī-ā-ñi	Huashpa	Widow.
214.		Shō-rō-ā	Huashpa	Son of 213.
215.		Tsī-lī-ā	Huashpa	Son of 213.
216.			Huashpa	Son of 213.
217.	José Cordero	Kī-mā-tī-wā	Yakke.	
218.	*Dominga Suina. f.	Nai-tī-yā	Huashpa.	
219.	Miguel Suina	Ā-hwĕ-rō	Huashpa	Son of 216, by former husband.
220.	*Lopita Moriaga. f.		Hitraani.	
221.		f.	Hitraani	Daughter 219 and 220.
222.	Nicanor Cordero	Sēr-sī-shrō-wī-tī-wā.	Huashpa	Son of 217.
223.	Santiago Cordero	Wā-yī-ī	Huashpa	Son of 217.
224.	Lorenzita Arcera. f.	Hai-shrō-mi-ŭtz	Hapani	Daughter-in-law of 217.
225.		f. Nā-wā-shrā-ŭtz.	Hapani	Daughter of 224.
226.		f. Hō-lī-ŭtz	Hapani	Daughter of 224.
227.			Huashpa	Small son of 217.
228.	Vivian Perez	Kī-yā-ū-lū	Tzitz.	
229.	*Refugia Pancha. f.	Shrai-mā-ŭtz	Hitraani.	
230.	José Maria Perez	Ā-tē-wā	Hitraani	Son of 228 and 229.
231.	*	f. Tsā-trai-yŭ	Huashpa.	
232.			Huashpa	Son of 230 and 231.
233.	Ysidro Perez	Kār-shkī-ŭtz	Hitraani	Son of 228 and 229.
234.	Juan Aguilar Perez	Wĕk	Hitraani	Son of 228 and 229.
235.	Salvador Perez.		Hitraani	Son of 228 and 229.
236.	Margarita Perez. f.	Ō-shā-tŭtz	Hitraani	Daughter 228 and 229.
237.	Alvanita Perez. f.		Hitraani	Daughter 228 and 229.
238.	Cleito Urina	Shrai-si-wī	Shipewe.	
239.	Anastasio Urina	Ēsh-kātch	Tzitz.	
240.	Sebastian Urina	Hā-kŭk-tī-wā	Tzitz	"Great pine."
241.	Miguela Arcera. f.	Ār-shō-ŭtz	Shipewe	Orphan.
242.	José Francisco Archeveque.	Tsī-ō-tī-wā	Shipewe.	
243.	*Sanatana Ortiz. f.	Tsi-shi-wŭ-nā	Tanyi.	
244.	José Miguel Archeveque	Kwi-yā-ī-tī-wā.	Tanyi.	
245.	José Hilario Montoya	Shtē-ra-ñi	Huashpa	Governor of the Pueblo.
246.	*Juana Maria Herrera. f.	Kī-ā-ŭtz	Yakke.	

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NO.	NAME: SPANISH.	NAME: INDIAN.	CLAN.	REMARKS.
247.	José Alcario Montoya....	Ā-pōtch.....	Yakke.	
248.	Manuel Montoya.....	Tsār-shrō-mā..	Huashpa..	Son of sister of 245.
249.	Juan Antonia Herrera...	Tsō-wā-sī-rō..	Hitraani.	
250.	*M. Luz Suina f.....	Tsī-tsī-ŭtz....	Hapani.	
251.	M. Dominga Herrera. f..	Tsā-shrō-mi-ŭtz.	Hapani.	
252.	José Domingo Challan...	Hā-wī-rā-nā...	Tzitz.....	Husband of 251.
253.	Rafaelito Lecheguayavi...	Shrā-ā-yā-tī-wa.	Tzutsuna.	
254.	*Kerina Urina. f.....	Hā-kiā-yā....	Huashpa.	
255.		f.	Huashpa.	
256.	Santiago Quintana.....	Kī-ē-kā-yā....	Tzutsuna.	Lieut.-Gov. of Pueblo.
257.	*	f. Kō-lī-yā ŭtz...	Hapani.	
258.			Hapani.	
259.	Augustinito Benadito....	Kaī-ō-wī-tī-ti-wā.	Hitraani.	
260.	*Anna Cordera. f.....	Kō-trā-yā-ŭtz..	Tzutsuna.	
261.		f. Tsī-kō-wī-ŭtz..	Tzutsuna.	
262.		f. Ā-yō-wī-ŭtz...	Tzutsuna.	
263.	José Siyero.....	Tsī-wai-ī-tī-wā.	?	
264.	*	f. Ī-ā-tŭtz.....	Tzutsuna.	
265.	Antonio Lucero Siyero ..	Kā tī-yā sī-rō..	Tzutsuna.	
266.			Tzutsuna.	
267.	M. Encarnacion Cordera.	f. Wā-ā-rū-mī...	Tanyi....	Widow.
268.	Juanito Chavez.....	Mī-itch.....	Tanyi....	Son of 267.
269.	*Inez Cordera. f.....	Hā-ā-tī-ŭtz....	Shipewe.	
270.		f. Skī-ā-rī-ŭtz....	Shipewe.	
271.		f. Mai-yā-rō-ts...	Shipewe.	
272.		Mai-yā-rō-tī-wā.	Shipewe.	
273.			Shipewe.	

In the above enumeration horizontal lines separate the members of one household from those of another. The first name in the household group is that of the head of the house, man or woman. The Spanish name is given: then the Indian name: then the clan. Under the heading "remarks" are given (a) the significance of the Indian names, necessary data regarding relationships, or facts of interest concerning the individual. An * before a woman's name indicates that she is the wife of the man just before named. Names immediately following those of a married couple are those of their children, unless otherwise

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stated. All names of females are marked with an f on the same line. In giving the Spanish names the informants' pronunciation have been closely followed. A curious variation in family names with variation in sex will be noticed: — the family name for males may end in ō, while for females it ends in a; e. g. Arcero, Arcera. Surprisingly few of the Indian names are significant: it is certain that some which are significant have not been translated, but it is equally sure that a large number of them are today "simply names." Where no names at all are given the individuals were mostly little children, whose names were unknown to or forgotten by my informants. The Indian names are spelled phonetically and are marked to indicate pronunciation; markings were considered unnecessary in the other columns. Two persons in the list — Nos. 61 and 263 — could not at the moment be located in the manner of clan, by my informants. This fact in itself renders it certain that they do not belong to any clan not mentioned and as both are males ignorance with regard to them will not affect any conclusions drawn.

With these words of explanation we may examine the tables and draw a few conclusions of interest. To completely work out the possible results would defeat one of the objects in view. Simple counting enables us to construct the following table:

CLAN NAME.	NUMBER OF MALES	FEMALES.	TOTAL.
Tanyi	10	5	15
Hapani	12	22	34
Tzitz	6	9	15
Hitraani	27	24	51
Tzutsuna	10	12	22
Huashpa	23	20	43
Oshatch	4	0	4
Isi	21	12	33
Shoame	13	11	24
Shipewe	14	11	25
Yakke	4	1	5
	144	127	
Unlocated	2		
	146	127	273

Eleven clans exist to-day at Cochiti according to this census. Their English names in the order above given are calabash, scruboak, water, cottonwood, coyote, Mexican sage, sun, ivy, turquoise, sage (Shipewe), maize. Comparing this list with the one given by Bandelier we fail to find three that he names — panther, bear, fire. On the other hand he fails to name one that occurs here — probably

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Shipewe—"a kind of sage." Santiago Quintana says he does not think there has been a clan of the panther, or of the bear; at all events there have been no such within his memory. He has known several that have died within that period —viz.: Kūtz (wood), Hā-kū-ñi (fire) and Kīr-shrā (elk).

The clan *oshatch* is now reduced to four men and no women. Left to itself, it must disappear with their death. The clan *yakke* is really no better off. The only woman remaining has but one child and that is a boy. She is well on in years and is little likely to have daughters. With her death the last natural hope of the clan is gone. In all such cases there is one chance of perpetuating the clan — that is by the adoption into it of a girl from another clan. Juan de Jesus Pancho, who is well informed, tells me that this adoption was really performed recently in the case of the fire clan. He asserts that the last man of the Hakuñi, before dying, adopted a girl named Kē-ai-tī-ŭtz, who still lives to continue the clan. Quintana, however, insists that such an action is not recognized unless the proper officials are notified and says that if adoption took place in this case it is not valid for lack of proper declaration and recognition.

Many suggestions regarding ideas of relationship come to the mind on a careful examination of the tables. The mere fact that, in the enumeration, the man's name appears first in each household shows the giving away of the old views regarding woman headship. The ancient idea of kin grouping, however, appears in many cases. Thus in the first household listed, while Santiago's name heads the list it is easily seen that the household is one of *Hapani*. Santiago's wife, not he, is the social centre. She and her daughters hold the house. He and his daughters' husbands representing *Tanyi*, *Tzitz* and *Hitraani* are tolerated therein.

Another evidence of the giving away of the old conditions before the new is the fact that the children, though of the mother's clan, bear the father's family name. Interesting, however, is the fact that while this is true, the girl does not change her name when she marries. Her *children* may take their father's name, but she does not.

That No. 50 should live with No. 48 is in full accord with old ideas. José Francisco is the son of Adelaido's sister and he can have no nearer relative among men than his maternal uncle. The boy is nearer related to his uncle than the little girl No. 51 is, although she is Adelaido's own daughter. That Ventura Cordero, No. 29, should live with his father Santiago Cordero, No. 27, after his mother is dead or married elsewhere, is entirely discordant with ancient views and only explicable on the breaking down of the old and the setting up of the new system.

Several times in the tables—Nos. 48.49, 72.73, 88.89, 172.173,—we observe a striking fact, the marriage of members of the same clan. Such a thing was not tolerated under the old system. Juan Pedro Melchoir and Ignacia Montoya, as

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being both Hitraani, could never have become man and wife. The sanction of the new creed has here broken down the ancient barrier. Membership in one clan is not necessarily relationship so close as to fall under the ban of the Church of Rome. The Indian yields to the church decision and to inclination and the wedding takes place.

The total population of Cochiti, which is one of the Queres group of Pueblos, is now 273 persons—males 146, females 127. It is probable that just now the number is growing. At the taking of the government census in 1890 there were 309 inhabitants. In 1894 came the terrible "mountain fever;" many died—26 in a single week. In the summer of 1895 a second attack carried off many others. But for the last two years the smitten community has prospered.

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STUDIES OF NORTH AMERICAN JASSOIDEA.

BY HERBERT OSBORN AND ELMER D. BALL.

THE studies recorded in this paper may be considered a continuation of those presented before the Iowa Academy of Sciences and published in Vol. IV., p. 172, (1897) under the title "Contributions to the Hemipterous Fauna of Iowa."

As in that paper, the special effort has been to detail the life-histories of the various species and is mainly concerned with common species occurring in Iowa; but in a number of instances it has been necessary, in order to present a systematic arrangement of the known forms, to include the species occupying all portions of North America and in some instances to describe those which are new to science. The studies have been prosecuted primarily for the purpose of determining the economic relations and importance of this group of insects and securing such facts as may furnish a scientific basis for dealing with those that are injurious to crops of the State. A paper dealing more particularly with the practical questions involved will appear in the report of the Iowa Experiment Station for 1897.

A REVIEW OF THE NORTH AMERICAN SPECIES OF AGALLIA.

The members of this genus are all small and sombre-colored; the individuals of a species vary little in pattern, but much in depth of color; the males are invariably smaller and darker than the females. They are all single-brooded as far as known, the larvæ being usually found in the rubbish on the ground around the base of their respective food plants from which they emerge to feed, those of the first two groups maturing in the fall and passing the winter as pupæ to issue as adults in early spring; those of the third group occurring in early summer, the adults appearing in July and August and hibernating to deposit eggs in early spring.

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The genus may be characterized as follows: Head, together with the eyes, wider than elytra at base; vertex transverse, crescentiform; ocelli on the face between the eyes; antennæ long, inserted under a feeble ledge, their bases partly visible, clypeus longer than wide, nearly rectangular; face as long or longer than width across eyes; pronotum long, anterior margin strongly rounding and extending forward below the eyes, side margin short or obsolete; elytra without an appendix; five apical and three anteapical cells; second transverse nervure sometimes present; marginal nerve of wing continued around apex, forming a supernumerary cell; color varying from whitish to dark fuscous, scarcely ever more than a trace of red, yellow or green, two round black spots on vertex rarely wanting.

The North American representatives of the genus may be readily divided into three groups, easily separable on adult characters, but which are even more strongly marked in those of the larvæ and in the life histories.

The species of the first group have the pronotum finely granulated without transverse striations, ornamented with two large spots near the posterior margin; the vertex is nearly parallel, the front expanded on the basal part; elytra brownish with light nervures, the base of the apical cells in a transverse line. The known larvæ are compact, reddish brown forms with long wing pads and compressed, dorsally, serrately carinate abdomen. Eyes much wider than the pronotum, which they partly enclose. The vertex is nearly flat above with two lobe-like projections arising from the anterior margin against the eyes and extending forward, or forward and inward, giving the insect a very grotesque appearance. They are found in the rubbish around the base of different plants, but only in moist and shady places. Of the group, *4-punctata* and *constricta* are typical representatives in their respective habitats and are closely related to the European *sinuata*.

In the second group the pronotum is finely granulated as in the first, but the two round spots are near the middle. The posterior margin of the vertex is elevated and carried forward between the eyes, appearing as a transverse line in the middle, front wedge-shaped, broad but not distinctly lobed above. The elytra are long and narrow and the apices of the anteapical cells are nearly in line. The larvæ are reddish-brown in color like those of the first group and are similar in form except the vertex. The entire posterior margin of the vertex is elevated and carried obliquely upward and forward before the eyes on the same plane as the face, the upper carinate margin being shallowly

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roundingly bilobed. They are found in similar situations with those of the first group, and while in appearance the lobate form of the vertex in the two groups is not strikingly different, yet when it is borne in mind that in the first case the lobe is simply an inflation of the anterior margin, while in the second it is the reflexed and elevated posterior margin, the difference in form of the adult vertices is readily understood.

The third group is characterized by a transversely striated pronotum on which the dark markings, if any, are in longitudinal bands and not in round spots on the posterior half. The front is very broad and suddenly constricted to meet the clypeus. The elytral nervures in the terminal portion are usually darker and more or less irregular, the central anteapical cell extending beyond the others. The larvæ are light-colored with dark lines, small, compact form, with a rounded parallel-margined vertex very similar to that of the adults, and short, elevated abdomen. They apparently prefer dry and exposed situations. This group includes the last five species, of which *sanguinolenta* is abundant and widely distributed and is closely related to the European *venosa* and the South American *signata*.

SYNOPSIS OF THE SPECIES.

A. Pronotum very finely, evenly granulated, posterior half of disc with two round black spots slightly farther apart than those on the vertex.

B. Posterior margin of vertex a regular curve or nearly so, vertex very narrow or obsolete behind the eyes, spots on pronotum close to posterior margin, sutural margin of elytra unicolorous.

C. ♀segment slightly narrower behind than in front, without an abrupt constriction; posterior margin truncate; ♂ plates broad at base, regularly narrowing to an acute tip. Specimens usually unicolorous except for the four black spots.

D. Broad and stout, nearly 2 mm. wide; elytra convex, short. ..... *4-punctata*, Prov.

DD. Narrower, wedge-shaped, elytra longer proportionately. ..... *modesta*, n. sp.

CC. ♀segment suddenly constricted and depressed near the middle; ♂ plates constricted in the middle, the tip enlarged, rounding; specimens usually with strong accessory markings.

D. Small, less than 4 mm. long, ♀segment broadly rounding behind ..... *constricta*, V. D.

DD. Larger, over 4 mm. long, elytra over 1 mm. longer than body; ♀segment with the posterior margin much produced, side concave..... *producta*, n. sp.

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BB. Posterior margin of vertex elevated and carried forward in the middle, vertex margining the eye behind, narrowing away toward the outer margin, spots on pronotum nearer the middle than the posterior margin, sutural margin of elytra usually light.

C. Species narrow, little more than 1 mm. in breadth, only one spot on vertex next eye.

D. ♀ segment deeply roundingly emarginate, central apical cell of elytra parallel margined.....*novella*, V. D.

DD. ♀ segment roundingly produced, the apex with a shallow notch, elytra very long with the central apical cell wedge-shaped.....*tenella*, n. sp.

CC. Species broader, nearly 2 mm. in width, three dark points on vertex next each eye, elytra maculate.....*oculata*, V. D.

AA. Pronotum coarsely transversely rugulose except for two spots on the anterior margin, dark markings absent or in the form of longitudinal bands.

B. Species light cinereous or whitish, spots on vertex small, elytra subhyaline, nervures light.

C. Elytra much longer than abdomen, narrow behind, costa nearly straight, ♀ segment long, deeply cleft.....*uhleri*, V. D.

CC. Elytra short and convex, only slightly exceeding abdomen, ♀ segment short, only slightly notched, *cinerea*, n. sp.

BB. Species darker, the spots on vertex large, usually with other markings, elytra subhyaline or fuscous, the nervures distinctly darker.

C. ♀ segment with posterior margin deeply cleft, (♂ plates narrow, tubular).

D. Species stout, elytra broadly convex, ♀ segment with four triangular points, ♂ plates narrower behind.....*bigelovia*, Bak.

DD. Species smaller, wedge-shaped, ♀ segment with two lateral points, ♂ plates tubular.....*gillettei*, n. sp.

CC. ♀ segment nearly truncate behind, slightly notched. (♂ plates broad, nearly flat).....*sanguinolenta*, Prov.*

* The *peregrinans* of Stal if, as believed, belonging to *Agallia* and including specimens we have from California, would fall in this synopsis next to *sanguinolenta*, but differing from that species, particularly in the form of the male plates.

AGALLIA 4-PUNCTATA Prov. (Plate I., Fig. 1.)

Bythoscopus 4-punctata, Nat. Can., IV., p. 376, 1872.

Ulopa canadensis, V. D. (nymph). Trans. Amer. Ent. So., XIX., p. 301, 1892.

Short and stout; elytra broad, convex, at rest wider than across the eyes; uniformly smoky-gray above except for two black spots on the

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vertex and two near posterior margin of pronotum. Length of ♀4 mm., width, 1.75 mm; ♂ slightly smaller.

Vertex short, transverse, more than five times wider than long, posterior edge crescentiform, slightly arcuated and elevated from the pronotum, anterior edge rounding to the face. Face broad and short, outer angle of the genæ prominent. Front broad and short, superior third abruptly expanded over the antennal bases, suture above nearly transverse, slightly arcuated and angled medially. Pronotum very finely punctured, more than twice wider than long, anterior margin strongly produced between the eyes, broadly depressed either side of the middle, lateral margin obsolete, the humeral margin touching the eye, posterior margin slightly emarginate. Scutellum equilaterally triangular, the apex produced. Elytra broad, convex, slightly longer than abdomen; at rest the costal margins are wider than across eyes, giving the insect a very compact appearance; venation very constant with the exception of the second cross nervure, which is often wanting, the bases of the four inner apical cells in a transverse line. Abdomen slightly crested.

Color: Above, obscure yellowish–brown, vertex yellowish–brown with two oblique black spots equidistant from each other and eyes, a faint brownish median line extending down to frontal suture, below which is lined with darker, antennal pits broadly black, facial sutures and tip of clypeus dark brown, sometimes brownish arcs on front, emphasized in two lateral rows of fuscous points. Pronotum yellowish-brown, darker in front, two distinct black spots near the posterior margin slightly larger and farther apart than those on the head. In highly colored examples there appears a median brown line, an oblique crescent near the humeral margin, and the anterior depressions become much darker. Elytra uniformly smoky subhyaline with lighter nervures, tergum and venter varying from yellow to fuscous, last ventral segment and genitalia light-yellow in both sexes.

Genitalia: ♀, ultimate ventral segment broad, slightly narrowing behind, anterior and posterior margins parallel, posterior margin usually arcuated or angularly elevated, giving it an emarginate appearance; pygofers broad and short, less than twice the length of the ultimate segment. ♂: Valve large, twice broader than long, lateral margin enclosing base of plates, posterior margin obtusely medially produced, plates together forming a triangle slightly longer than wide at the base, one-half longer than valve.

Specimens are at hand from Ont., N. Y., N. H., D. C., Ia., Kans., Ky., Ark., Neb., and Colo.

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Nymph: Compact, reddish-brown, with prominent eyes, stout, short legs, vertex prolonged on either side of the middle third into a flat process, abdomen with a median notched carina; length, 3 mm.

Vertex nearly flat, projecting forward, parallel-margined for more than half of its length in front of the eyes, middle third of anterior margin cleft half-way to base, leaving two flat "horns" longest on lateral margins, where they equal their width at base, their anterior margins obliquely rounding to the medial cleft, face similar to adult, upper part of front projected on either side into an elevated rounded lobe which overhangs the base of the long antennæ, thoracic shield equalling the abdomen in length, medially carinate, abdomen short and narrow, above compressed into a high keel, each segment being elevated most on the posterior margin, giving it a serrate appearance. Legs stout, more adapted to walking; whole surface roughly and irregularly pitted.

While at first sight this appears to be a very distinct form it agrees with the *Pediopsis* larva in the crested abdomen and except for the projections on the vertex bears a striking resemblance to the larva of *Tettigonia bifida*.

Life history: Larvæ and pupæ were collected first October 12 of last year and were determined to be *U. canadensis*, V. D., and so reported in the "Additions to List of Hemiptera of Iowa."* They were again collected from sheltered situations January 1, 1897, (a very warm day). Early in May they were again found and placed in breeding cages and soon emerged as *Agallia 4-punctata* females, the males probably having issued before. They are single-brooded, the adults appearing in early spring, the females remaining until into July. The eggs are probably all deposited by the middle of June, from which the larvæ appear in July and by fall are nearly or quite full grown, passing the winter and issuing as adults again early the next spring. They have been found on a great variety of plants, mostly pertaining to the compositæ, horse-radish, beet, *Helianthus*, *Eupatorium*, etc. The larvæ remain on or near the ground and conceal themselves in the rubbish and humus for which their color and appearance is peculiarly adapted. They only occur in shaded locations or on such plants as horse-radish, beets, etc., that furnish a deep shade and a moist humus. The adults are usually found on the younger portions of the stems and may be taken in abundance from *Eupatorium* in May.

* Proc. Iowa Acad. Sci., Vol. IV., p. 231.

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AGALLIA MODESTA n. sp.

Form of *constricta* nearly but smaller, smaller and narrower than *4-punctata*, superior portion of front less dilated; elytra much narrower. Length, ♀ 3.75–4 mm.; ♂, 3 mm.

Vertex narrow, rounding from the elevated posterior margin, giving it the appearance of a crescentiform elevated ridge; margin behind eye very narrow, nearly obsolete. Face narrower than in *4-punctata* or *constricta*, the outer angle of the genæ farther from eye, more obtuse. Front with the superior third widest at base, from which it rapidly and evenly narrows instead of being parallel-margined and abruptly narrowing, remainder of front slightly narrower and longer than in *4-punctata*. Pronotum finely punctured, twice wider than long, lateral margin obsolete, humeral margin short, posterior margin straight, very long, whole outline very nearly a semicircle as in *constricta*. Elytra long and narrow, similar to those of *constricta;* at rest they are folded at an acute angle above; costal margin not convex, giving a wedge-shaped appearance to the insect; venation similar to *4-punctata*, apical cells longer, entirely beyond tip of abdomen.

Color: Light yellowish-brown with four round black spots located as in *4-punctata*. Vertex and face light-yellowish, with a pair of large rounded spots on the superior margin equidistant from each other and eyes, a narrow margin around the ocelli and the antennal pits black, a narrow median line on the vertex, one either side next eye, light ferruginous, clypeus and all of front except a narrow median stripe on inferior half, and a spot near superior margin reddish-brown. Pronotum light-yellow with two round spots slightly farther apart than those on the vertex and less than their own diameter from posterior margin, black, an indistinct median line, two spots in the depression of the anterior margin and sometimes a mark on the humeral margin, reddish-brown. Elytra smoky and hyaline, nervures lighter; very dark examples may have the reddish-brown marking on the clypeus, front and pronotum changed to a dark chestnut and the elytra to a dark smoky, the black spots on the back of the pronotum enlarged, and the reddish-brown markings on the anterior margin localized into two small approximate round dots.

Genitalia: ♀, ultimate ventral segment slightly longer than penultimate, the sides parallel, posterior margin truncate, posterior part of segment curved around base of ovipositor, ovipositor proportionately longer and narrower than in *4-punctata*. ♂, ultimate segment short,

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light-yellow, valve long encircling the base of the plates; plates together wedge-shaped, somewhat longer than their width at base, slightly constricted one-third the distance from tip.

Described from seventeen examples collected in Mexico (Osborn). Readily separable from *4-punctata* by the narrower form and from *constricta* by the truncate ♀ segment.

AGALLIA CONSTRICTA V. D.

Can. Ent., XXVI., p. 90, 1894.

Size of *modesta* nearly, but with shorter elytra, smaller than *4-punctata*, elytra less convex, light testaceous with four black spots as in the former species. Length, ♀ 3.50–4 mm; ♂ considerably smaller.

Vertex proportionately wider than *4-punctata*, posterior margin slightly elevated, anterior margin rounding to the face. Front broad at the base, suddenly narrowing before the middle, from there convexly narrowing to the clypeus. Pronotum similar to *modesta*, longer than in *4-punctata*, humeral margin more oblique than in *modesta*, posterior margin truncate or very slightly excavated. Elytra longer and narrower than in *4-punctata*, folded perpendicularly together at the tip, obliquely at base, only slightly convex.

Color: Light testaceous yellow, two round spots on vertex, two more on posterior margin of pronotum and the antennal pits black, a narrow median line on pronotum and vertex, the facial sutures, a narnow line next each eye, an oblique mark on the humeral margin of pronotum and two approximate spots near the anterior margin brownish testaceous.

Genitalia: ♀, ultimate ventral segment long, nearly parallel-margined, posterior half abruptly constricted, roundingly depressed on either side a carinate median line, posterior margin obtusely rounding. ♂, valve long, compressed; plates long and narrow, broadest at the base, constricted in the middle, widening again to the rounding tip; pygofers prominent, laterally compressed, about equaling the plates.

Specimens are at hand from Long Island, N. Y., D. C., N. J., Ky., Fla., La., Miss., and Texas. Readily separable from the two preceding by the constricted ♀ segment.

AGALLIA PRODUCTA n. sp.

Form of *constricta* but longer, as large as *4-punctata*, with longer, narrower elytra. Dark smoky-brown, with larger black spots arranged

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as in the preceding species. Length, ♀, 4.5 mm., width, 1.50 mm.; ♂ smaller.

Vertex: Width as in *constricta*, over six times wider than long, posterior margin roundingly angular as in *Pediopsis*, slightly elevated. Face broad and short, genæ parallel-margined below eyes one-third the length, then sharply angulate and straight-margined to the clypeus. Front intermediate in form between *modesta* and *constricta*, broad at base, roundingly narrowing on basal third, abruptly constricted, then slightly, convexly narrowing to the clypeus. Pronotum convex, finely granulose, twice wider than long, humeral margin long, posterior margin truncate. Elytra much longer than in *4-punctata*, costal margin less curved, less convex, apical and anteapical cells longer. Second cross nervure not present in any of the specimens in hand.

Color: Dark fuscous-brown and light-gray in strong contrast. Vertex and face light-yellow, with the round spots on vertex and antennal pits black, facial sutures, margins of ocelli, a band on either side of the front and the lower half of clypeus, dark reddish-brown, median line of vertex and one margining either eye light reddish-brown. Front, above and outside of dark band, suffused with reddish. Pronotum and scutellum light-yellowish, a pair of roundingly triangular spots near posterior margin of pronotum black, a median line sometimes expanded on posterior margin of pronotum and again near tip of scutellum, an oblique mark on humeral margin of pronotum, a spot on either side of the median line on its anterior part and a spot near the basal angle of scutellum reddish-brown. Elytra dark smoky-brown with pale nervures and sutural margin in strong contrast.

Genitalia: ♀, ultimate ventral segment very long, posterior part constricted more strongly than in *constricta*, the division often appearing as a fold or "tuck," which is deepest at the margin, growing shallower and curving backwards near the median line, posterior margin strongly concavely produced from the lateral angles, tip of produced part truncate but often angularly elevated, giving the impression of a slight median notch, the produced part being two-thirds of the whole constricted portion, pygofers about three times longer than wide. ♂ genitalia similar to those of *constricta*, the valve shorter and more prominent, the plates broader at the tip and less constricted medially. Described from ten examples collected January 12, at Orizaba, V. C., Mexico, (Osborn).

Readily separated from *4-punctata* by the length of the elytra and

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the genitalia; from *constricta* by the larger size and the much more produced ♀ segment.

A larva collected at the same time evidently belongs to this section of the genus, and from its large size apparently to this species, and will be described here.

Larva: Form very similar to that of *4-punctata*, slightly larger with the anterior "horns" much more produced, resembling the structure found in the beetle, *Boletotherus bifurcus*. Length, 3.25 mm. Vertex much narrower than the prominent eyes which margin the pronotum on the sides, median third of vertex consisting of a thin, slightly elevated plate with a broadly rounding anterior margin; between this and the eye, on either side, arises a long obovate anterior process over three times longer than width at base; these are slightly inclined toward each other so that their elevated inner margins almost touch at the broadest point. Pronotum over three times wider than long, anterior and posterior margins parallel, wing pads very long and narrow, abdomen short, laterally compressed, carinate as in *4-punctata*, the whole surface armed with bristle-bearing papillæ, largest on abdomen and on the margins of the anterior processes.

Color: Obscure reddish-fuscous above, marked with white as follows: A narrow margin on the anterior processes, a large triangle on the vertex, its base including all the anterior margin between the horns, the apex continuous with a median line across the thorax, a narrow line on the lateral margin of the pronotum extended back to inner angle of the wing pads, a curved line just inside of these and a few oblique lines on the wing pads; beneath, fuscous, legs and genitalia lighter.

AGALLIA NOVELLA, Say. (Plate I., Fig. 2.)

Jassus novellus Say. Jour. Acad Nat. Sci., Phila., VI., p. 309, 1831.
Macropsis nobilis Forbes. Fourteenth Rept. Ill. St. Ent., p. 22, 1884.

Narrow, wedge-shaped, testaceous-brown with four points on anterior margin of vertex and two small spots just back of the middle of the pronotum, black, the sutural margin of the elytra light, twice interrupted with dark. Length, ♀ 3.75 mm.; width, 1.25 mm. ♂ slightly smaller.

Vertex very short, extended broadly around behind eyes until just before the outer margin, where it is suddenly constricted, posterior margin with the middle half abruptly elevated and carried forward.

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Face moderately long, genæ slightly constricted below eyes then rounding to the middle of loræ. Suture above the front angulated, front long, rapidly concavely narrowing on basal third, then slowly convexly to clypeus, loræ twice longer than broad. Pronotum finely granulated twice wider than long, half the length within the curve of the vertex, side margin entirely wanting, humeral margin short, rounding, posterior margin truncate, long, anterior margin elevated and produced on the middle half, laterally depressed and covered by the vertex. Elytra long and narrow, extending over one-third their length beyond the tip of ovipositor.

Color: Light-testaceous, sometimes varying to slate color on the elytra, especially in the males. Pronotum testaceous with a dark-brown median line, a small round black spot just behind the middle of either side. Vertex testaceous or yellowish with a median line extending to the angle of the frontal sutures, a pair of round spots on posterior (superior) margin slightly farther from each other than from the eyes, black, facial sutures testaceous to light slate, nervures and sutural margin light, tips of the claval nervures broadly white with a dark saddle them which interrupts the light sutural line. Below, variable from between yellow to black except the genitalia, which are light-yellow.

Genitalia: ♀, ultimate ventral segment very long on lateral margins, posterior margin deeply circularly excavated from the lateral angle over half way to the base, pygofers narrow, moderately long, slightly exceeded by the oviducts. ♂, valve two-thirds as long as width at base, truncate behind; plates long, nearly as wide as the valve, parallel-margined, nearly truncate behind; pygofers large, inflated, convex, forming a hollow, box-like organ as seen from below, with a nearly square opening, which the plates close like a lid; seen from the side they are very broad at the base, hollowed out near the middle below and near the top above.

Specimens are at hand from Can., N. Y., Va., D. C., Mich., Ky., Ia., Kan., Colo., Mex., and Vancouver's Island, indicating a very wide and general distribution.

Larva: Larvæ very similar to those of *4-punctata*; vertex extending upwards and slightly forward as a transverse carina, not deeply lobed.

Vertex very short, appearing as a transverse carina projecting slightly upwards and forwards, divided by a shallow median excavation into two broadly-rounding lobes. Face very flat, front wedge-shaped with a distinct suture just below the obscure ocelli, very

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slightly expanded over the antennal pits. Pronotum broad and short, wing pads long, oblique, abdomen compressed and carinate dorsally as in *4-punctata*, in color reddish-brown, margins of segments and of facial pieces slightly lighter, an oblique fuscous band from base of crest to the venter on third segment and another from the crest of the fourth segment to the venter on sixth.

Life History: Larvæ were found with those of *4-punctata* in January and again in May. They continued to be found for some time after the latter had all issued. The adults were common, both males and females, nearly through July. The larvæ appeared in August, a few weeks later than those of *4-punctata*, with which they were found constantly associated. They become nearly full grown by fall and pass the winter under the leaves and rubbish to pupate in early spring and later appear as adults.

AGALLIA TENELLA n. sp.

Similar to *novella* in appearance, elytra longer and more pointed behind, spots on pronotum obscure brownish. Length, 4.25 mm.; width, 1.25 mm.

Vertex similar to *novella* in shape, margin behind eyes narrower, less constricted outwardly, face broad, short, genæ paral-parallel-margined below the eye, then slightly inflated before rounding to the loræ. Front broad and short, width at base nearly equal to length, narrowing nearly uniformly throughout to the clypeus, loræ twice longer than wide, frontal suture obtusely angulate, the apex reaching nearly the level of the ocelli. Pronotum finely granulated much as in *novella*, humeral margins longer, less rounding, elytra long and very narrow, two transverse nerves between the first and second sector, veins on clavus approaching very closely on the middle half.

Color: Light-gray with vertex and scutellum yellow, spots on vertex and pronotum dark. Face light-yellow, sutures dark-brown, inner pair of spots on vertex small, outer pair larger than in *novella*, not as far behind eye, as large as the inner pair. Pronotum light-gray with a median line and two obscure spots near the middle on either side reddish-brown, scutellum yellow with a triangular spot near the basal angle on either side, two spots and a transverse line on the disc black. Elytra smoky sub-hyaline with light nervures and light sutural margins interrupted by a dark saddle between the claval nervures and another at the base of the inner apical cells.

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Genitalia: ♀, ultimate ventral segment long, lateral margins parallel, posterior margin produced one-half the length of the segment on the middle, sloping away to the lateral angles, tip slightly but distinctly notched; pygofers stout, two and one-half times the length of the segment, slightly exceeded by the oviducts.

Described from three females, Vera Cruz, Mex. (Osborn). Readily separated from the other two of the section by the genitalia and length of elytra.

Larva: Form similar to that of *novella*, vertex longer, nearly equaling the pronotum in length, reddish-brown with light spots in four longitudinal rows. Vertex widening from eyes obliquely upward and forward in a plane with the face, upper margin acute, roundingly lobed. Vertex, front and clypeus forming a concave-margined wedge, thorax much as in *novella*, abdomen with two weak lateral carinæ, reddish brown with a light upper margin to the vertex, four white bristle-bearing tubercles on the posterior margin of each thoracic and abdominal segment.

AGALLIA OCULATA V. D.

Ent. Amer., VI., p. 38, 1890.

Species large, stout, much broader than *tenella*, resembling *producta* in form and size but easily distinguished by the central position of the pronotal spots, and the curvature of the vertex. Length, 4.50 mm..; width, 1.50 mm.

Vertex rather broad against the eye, nearly regularly narrowing to the middle, where it is simply a line, posterior margin produced around behind the eye, then slightly expanded and convexly rounding to loræ. Frontal suture slightly curved, front very broad at base, three times width on clypeus, wider than long, sides slightly constricted above the middle. Pronotum long, the posterior margin short, truncate, humeral margin long rounding to the eye, more than half the length of the pronotum within the curve of the vertex. Elytra long convex in front, narrow behind, veins on clavus approaching in the middle.

Color: Fulvous-brown, spots on vertex and pronotum black, nerves of elytra light, interrupted by dark-brown bands, vertex light-fulvus with a median line, two large spots on the disc, a pair of smaller ones against each eye, black; sides of front, tip of clypeus and facial sutures dark-brown. Pronotum fulvous, a large spot near the center of either side, black, a median line, a small spot on either side of it near

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the anterior margin, and another small spot on the humeral margin back of either eye dark-brown. Elytra testaceous-brown with light nervures interrupted with dark-brown before the middle.

Genitalia: ♀, ultimate ventral segment nearly twice wider than long, posterior margin slightly curved, pygofers long, stout, four times longer than the ultimate segment, tip of ovipositor exceeding the pygofers, reaching the base of the apical cells.

AGALLIA SANGUINOLENTA, Prov. (Plate I., Fig. 3.)

Bythoscopus sanguinolenta Prov. Nat. Can., IV., p. 375, 1872.
Bythoscopus siccifolius Uhl. Bulletin U. S. Geol. and Geog. Survey, II., p. 359, 1876.

Small and compact, broader and flatter than any of the preceding species, vertex short and broad, two large dark spots slightly farther from each other than from the eye, pronotum transversely rugulose, short and broad, without distinct spots, elytra sub-hyaline with dark nervures except at the base. Length, 3 mm.; width, 1.50 mm.

Vertex about four times wider than long, over one-third the length of the pronotum, margins broadly rounding, nearly parallel, posterior margin not elevated, touching the pronotum throughout. Face broad, genæ very slightly angular. Front, width at base equaling length, slightly narrowing to the middle where it is nearly parallel-margined, roundingly narrowing to the clypeus where it is still very broad, clypeus half longer than broad, sides parallel. Pronotum transversely rugulose except a small area just behind the inside corner of the eye, over twice wider than long, humeral margin long, side margin short but distinct, anterior margin broadly and regularly curved, curve including nearly one half the length of pronotum, scutellum large, triangular, tip long, attenuate, partly concealed beneath the elytra. Elytra broad, convex, scarcely narrowed before the broad apex, a little longer than the abdomen.

Color: Light gray, with a very variable amount of dark fuscous markings. Vertex yellowish with a pair of large round spots slightly farther from each other than from eyes, black, a median line and one next each eye, dark reddish-brown. Face yellow with sutures, six or seven short arcs on each side of the front, and a longitudinal line on the clypeus, reddish-brown. Pronotum light-gray with a series of impressed points back of the anterior margin, a median line enclosing

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a narrow light one and two lateral longitudinal lines reddish-fuscous. Elytra with the first sector as far as the first fork and the veins on clavus broadly light, interrupted on the outer claval veins before the tip, remainder of nervures, the claval suture, the internal areas on clavus and a more or less definite saddle extending across the back between the apices of the two claval nervures, brownish-fuscous. The color is subject to great variation but the two round spots on the vertex persist in almost black forms.

Genitalia: ♀, ultimate ventral segment twice wider than long, the posterior margin very slightly sinuate either side of a shallow median notch; pygofers short, broad, scarcely twice longer than width of base. ♂, valve short, truncate; plates broad, half longer than wide, truncate at apex, the bases enclosed by the inflated pygofers whose tips, slightly exceeding the plates, are thickly set with coarse hairs.

This is a widely distributed species. Specimens are at hand from Ont., N. Y., D. C., Ky., Ala., Miss., Ia., Kan., Neb., Wyo., Colo., Arizona, Cal., and Vera Cruz, Mex.

The larvæ somewhat resemble the adult in form; very short and plump, head slightly wider than thorax, wing pads flaring, in the pupæ reaching the fourth abdominal segment, abdomen short, plump, the tip elevated so that the visible part of each segment is narrowest above.

Color: Creamy-white with heavy fuscous spots and bands. Vertex with the two round spots and median band as in adult, the markings next eye heavier. Face with the sutures and a few arcs on the front fuscous as in adult, thorax with a narrow median light line between two broader dark ones that expand on the anterior margin of each segment, an irregular dark blotch behind each eye extending as a band back to the inner angle of the wing pad, then obliquely outward along the inner margin, a pair of narrow wedge-shaped lines between these and the median one on the posterior segment, an oblique line on the wing pad and a marginal line on the outer and posterior margin, brownish-fuscous. Each abdominal segment with a broad brownish dark band on the anterior margin, venter light. Length of pupæ about 2mm.

AGALLIA UHLERI V. D.

Can. Ent., XXVI., p. 91, 1894.

Slightly longer and narrower than *sanguinolenta*, the elytra much longer, less convex, light grayish-brown, almost unicolorous above but

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for the spots on the vertex and scutellum and the terminal nervures. Length, ♀, 3–3.25 mm.; width, 2.25 mm. or over.

Vertex distinctly broader and shorter than in *sanguinolenta*, the eyes much wider than the pronotum. Face somewhat longer than wide, the genæ scarcely angulate, frontal suture strongly arcuated, indistinct. Front longer than breadth at base, scarcely wider than the clypeus below. Pronotum more than twice wider than long, humeral margin nearly straight, touching eye, posterior margin long. Elytra long and narrow, portion of corium extending beyond tip of clavus being longer than its width at base, apical cells long, central anteapical cell extending posteriorly much farther than adjacent ones.

Color: Pale grayish-brown tinged with yellowish on pronotum and vertex, two sharp round spots on vertex and two triangular ones just inside the basal angle of scutellum projected forward and slightly visible through the semi-transparent pronotum, black, sometimes a transverse line on scutellum and an irregular impressed one back of anterior margin of pronotum, dark-brown. Face pale-yellowish, sometimes suffused with reddish-brown, a few pale arcs on the front, ocelli red, basal two-thirds of elytra light-gray with indistinct nervures, apical third subhyaline with distinct dark nerves, usually an interruption on the outer claval nerve and a narrow line margining the light sutural line, fuscous.

Genitalia: ♀, ultimate ventral segment as long as breadth at base, very slightly narrowed posteriorly, the posterior margin with a deep roundingly triangular notch reaching over one-third the distance to the base, pygofers short and stout, scarcely exceeding the apex of the clavus; ♂ valve short, posterior margin truncate, lateral margin oblique, plates longer than broad, slightly narrowing and cupping to the truncate tip, their base enclosed by the inflated pygofers, which slightly exceed them in length and meet behind in a slight keel.

Specimens are at hand from Wyoming, Colorado, New Mexico, and it was collected at Sioux City, Iowa, from hill-top, July 7th.

Readily separated by the length of the elytra and by the single deep notch in female segment.

AGALLIA GILLETTEI n. sp.

Form narrower and more wedge-shaped than *sanguinolenta*, elytra narrower and longer, pattern of ornamentation similar but less distinct, elytra without transverse bands. Length, ♀, 2.75–3 mm., width, less than 1.25 mm.; ♂ slightly smaller.

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Vertex narrower next eye than in *sanguinolenta*, more produced and rounded between the ocelli, face more rounding, genæ scarcely angulate. Front similar to *sanguinolenta*, the basal suture more rounding, pronotum similar to *sanguinolenta*. Elytra longer, less convex, apical cells longer.

Color: Grayish-brown tinged with yellowish. Vertex with two round black spots smaller than in *sanguinolenta*, a broad median line enclosing a narrow light line, an arcuated line on either side arising from a spot at the inner posterior angle of the eye, then curving out to a point near the ocelli, with which it is connected by a short line, then back to the margin of the eye and obliquely down to the frontal suture above the antennæ, reddish-brown, ocelli bright red. Face marked much as in *sanguinolenta*, the frontal suture much more arcuated, less distinct. Pronotum cinereous-brown, an arcuated row of coalescent dots back of the anterior margin, three pairs of more or less distinct dark-brown longitudinal lines, the inner pair enclosing a narrow light line. Elytra, base fuscous with light nerves, remaindet hyaline with dark nerves; no indication of transverse bands as in *sanguinolenta*.

Genitalia: ♀, ultimate ventral segment broad, laterally parallel-margined from the base one-half its length, then the surface depressed and the margin roundingly narrowing one-fourth the entire width, posterior margin excavated from the acute lateral angles by three successive steps, the first being strongly oblique, to the bottom of a narrow median notch reaching over half-way to the base of the segment. ♂, valve twice wider than long, anterior and posterior margins parallel, side margin straight, oblique; plates nearly three times the length of the valve, the margins rolled up forming a half cylinder with a diameter slightly greater than the truncate apex of the valve, the ends of the plates convexly folded closing the end; pygofers only appearing from below as a fold around the base of the plates. Suture between the plates broadly dark, towards apex.

Described from numerous examples collected in Arizona by Prof. Gillette, to whom it is dedicated as a slight acknowledgment of the favor extended in placing all of his available material at our disposal.

A very distinct little species, slightly smaller and of more uniformly fuscous than *sanguinolenta*, shorter and darker than *uhleri*. Readily separated from either by the very distinct genitalia of either sex.

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AGALLIA BIGELOVIA Bak.

Psyche, VII., 240, Sup., p. 26, 1896.

Form similar to *sanguinolenta*, but broader, more robust, color pale-grayish, obscurely marked with fuscous, spots on vertex and scutellum large, black. Length, 3 mm., width, 1.50 mm.; ♂ slightly smaller.

Vertex very broad and full, nearly half as long as pronotum, eyes much wider than pronotum. Face broad, genæ with a very slight constriction, then almost straight-margined to the clypeus. Front broad above and nearly parallel-margined, rounding below, but much broader than clypeus. Pronotum short and broad, lateral margin obsolete, humeral margin rounding, very oblique, elytra broad, not as strongly convex as in *sanguinolenta*, somewhat exceeding the abdomen. Venation slightly irregular.

Color: Pale yellowish-gray, vertex light, with two large round spots as in *sanguinolenta*, black, sometimes a broad, indistinct median line and a triangular spot next each eye connected with the ocelli by a slender line, reddish-brown, face pale, sutures and frontal arcs indistinctly reddish-brown. Pronotum gray, sometimes with indistinct longitudinal brown bands, scutellum with two black triangles just within the basal angles and extending forward under pronotum. Elytra pale-gray with fuscous nerves on the corium beyond the branching of the first sector, a few narrow fuscous lines on clavus.

Genitatia: ♀, ultimate ventral segment broad and short, posterior margin consisting of two lateral rounding lobes and two intermediate acuminate ones slightly narrower and shorter, their median incision reaching nearly to the base, pygofers broad and short. ♂ valve narrow, not more than half wider than long, margins parallel, disc inflated, convex, plates three times the length of the valve, sub-cylindrical at base, laterally compressed at apex, giving them a long, triangular appearance, pygofers much inflated, enfolding the base of the plates, rapidly narrowing to a point before the apex of the plates.

Lower California, Mexico; Winslow, and Albuquerque, New Mexico.

The original description was from a single female with much shorter elytra than the average. Readily distinguished by its stouter appearance and distinct genitalia.

AGALLIA CINEREA, n. sp.

Form of a small *sanguinolenta*, the vertex slightly longer and stronger, elytra even shorter and broader, about equaling the abdomen, pale-

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yellowish cinereous above with two small points on vertex and sometimes the angles of scutellum black. Length, 2.5 mm., width, 1.25 mm.

Vertex stout and broad, one-half the length of the pronotum, slightly inflated in the middle, the posterior margin touching the pronotum. Face convex, moderately broad, the outer angle of the genæ obscure, frontal suture strongly rounding. Front broad, roundingly narrowing, much broader than clypeus, clypeus narrow, parallel-margined, loræ more than twice longer than wide, longer than clypeus. Pronotum coarsely transversely rugose posteriorly, finely granulated just behind the eye, much narrower than eyes, more than twice wider than long, anterior margin broadly rounding, including two-thirds of the length, humeral margin very oblique attaining eyes, posterior margin short, roundingly emarginate. Elytra short, slightly exceeding abdomen, the venation weak, apical cells short, the second often not separated from the first anteapical, forming a long, narrow, slightly curved cell.

Color: Pale cinereous, much paler than in *uhleri*. Vertex touched with yellowish, two small round dots slightly farther from each other than from the eyes, black. Face pale creamy-yellow above with dark red ocelli, reddish below. Pronotum pale cinereous, unmarked. Elytra pale, sub-hyaline gray with light indistinct nervures.

Genitalia: ♀, ultimate ventral segment short and broad, shorter than in *sanguinolenta*, posterior margin slightly rounding with a faint median notch; ♂, valve very short and broad, posterior margin rounding, often nearly concealed under the ultimate segment, plates nearly twice longer than broad, roundingly narrowing to the truncate dark-tipped apex.

Described from numerous examples from Iowa and Colorado.

The Iowa examples were taken at Little Rock and Sioux City in July, from high gravelly points where plants characteristic of the plain region, such as Bouteloas and Artemisias predominated and from which several other species of western Hemiptera were taken. The Colorado specimens were received through the kindness of Prof. Gillette.

Larva: Form of the larvæ of *sanguinolenta* nearly, head somewhat stronger, the dark bands almost wanting. Head broad, somewhat inflated, eyes wider than thorax, thorax narrow, the wing pads shorter, abdomen slightly carinate and curved upwards; color, creamy-white, two distinct spots on vertex as in adult. Face pale-reddish, pronotum light, a single oblique line on either wing pad, abdomen paler, not banded. Length scarcely 2 mm.

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AGALLIA PEREGRINANS Stal.

Bythoscopus peregrinans Stal. Freg. Eugenes. Resa. Ins., p. 291, 1859. Berg Hemipt. Argent., p. 276, 1879.

Agellia peregrinans Berg. Addend. et Emend ad. Hemip. Arg., p. 176, 1884.

While this species seems quite certainly to be an *Agallia*, especially from the description of Berg, lack of access to the original description of Stal leaves some doubt as to the specific determination. A species represented in our material by a number of examples from Southern California and Palo Alto, Cal., should probably be referred here and they would fall under the third division of the synopsis next to *sanguinolenta*, from which they may be separated by the larger size, longer elytra, and female segment and the tubular plates in the male.

DESCRIPTIONS OF EARLY STAGES AND NEW SPECIES OF BYTHOSCOPIDÆ.

MACROPSIS APICALIS n. sp. (Plate II., Fig. 1.)

Form of *robustus* nearly, somewhat larger, elytra longer; green, the elytra sub-hyaline with green pubescence, infuscate at the apex. Length, ♀, 5 mm.; ♂, 4.5 mm.; width, ♀, 1.8 mm.; ♂, 1.3 mm.

Vertex over three times wider than long, as long as the eye, margins parallel, slightly curved, anterior margin rounding to the face, face half wider than long, front tumid, clypeus and genæ flat. Pronotum large, two and one-half times the length of the vertex, twice wider than long, side margins very long, carinate, surface with fine but distinct transverse striations, scutellum large, transversely striate, elytra full three times longer than wide, margins nearly parallel, less convex than in *robustus*, clavus with the apex obliquely truncate, inner apical cell wanting, confluent with the broad appendix, the marginal nerve becoming obsolete not far from the base, fourth apical cell narrow at the apex, next two short, broad behind, three anteapical cells, the outer one smallest, whole surface of elytra except the broad appendix clothed with short, remote hairs.

Color: Bright-green, pronotum shiny, elytra appearing lighter from the reflection of the light-green hairs, the apex of clavus, tip of

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second sector, the line separating the appendix from corium, and a spot on the margin of each apical cell, black; legs and below, deep-green, tarsi blackish at the tip.

Genitalia; ♀, ultimate segment twice wider than long, rounding, or slightly produced with a slight notch; ♂, valve long, parallel margined, rounding behind, angularly elevated along the median line.

Described from numerous examples collected from the honey locust at Ames and Sioux City, Iowa, and one from West Point, Neb.

Larvæ: Similar in form to the adult, very noticeable for their large pronotum and the entire dorsal surface being covered with stout hairs, bright-green, those on more exposed situations, brownish.

This is a common species on the honey locust wherever it has been examined, but has never been found elsewhere. There are two broods in a year, the adults appearing in June and again in September. It is intermediate in size between *robustus* and *elaeta*, but differing from both in venation and in the elytral hair being light-green.

Bythoscopus distinctus V. D. (Plate II., Fig. 2.)

General form similar to the preceding, about one-third smaller, head green, reduced to a curved line bordering the rounding pronotum, narrower than the dark-brown eyes. Pronotum greenish, coarsely pitted with black, darker behind the eyes, scutellum triangular, green, with the corners black, wings with a broad band at base, the tip and a narrow band before it black; in light specimens the whole wing is of a grayish slate except for a black spot in place of the middle band.

Larvæ: Stout green forms with thicker, blunter heads than the adults, nearly straight-margined, with a few long hairs projecting forward, body large, plump, abdomen ridged above, the sides with a flap-like margin which fits around the sides of the leaf-stem, or twig upon which the insect rests.

This species occurs in abundance on black walnut and butternut and adults have been found on hickory and hackberry, but only where they were adjacent to the first-named trees. Full-grown larvæ and freshly-issued adults were found the second week in June; a few days later the larvæ had all issued, the adults remaining abundant until into July. The second brood of larvæ appeared before the middle of August, the adults again in the latter part of September, to hibernate and deposit eggs in the spring.

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PEDIOPSIS TRISTIS V. D. (Plate II., fig. 3.)

This is a large, narrow, grayish-brown species from one-fifth to one-fourth of an inch long. The head from above appears only as a light line from the eyes around the angular point of the pronotum. The pronotum has a narrow light margin behind and is covered with fine light hairs, the wings are slightly transparent, setting off the dark-margined raised veins. Easily recognized by the face below being light-greenish with a large black spot in the middle below the eyes and a band on the margin above.

The larvæ are very similar in form to those of *B. distinctus*, but the abdomen is not as strongly ridged and the head is broader. They are reddish-brown above, marked with whitish on some of the sutures, and with four dark-margined light spots in the form of a square on the body. The whole surface is covered with fine white hairs, giving a light reflection. The face is light with a large black spot as in the adult.

The species seems to be strictly confined to plum trees, to which it is admirably adapted in color. They were found to occur most abundantly on the native plums but have been taken from cultivated varieties.

The larvæ appear in May and have all issued as adults by the end of June. The first adults appear about the third week in June and are found abuudantly throughout July, disappearing before the middle of August.

PEDIOPSIS FERRUGINOIDES V. D. (Plate II., Fig. 4.)

This is a very pretty rusty-red species a little larger than *viridis*, being nearly one-fourth of an inch long (5 mm.); the females vary from reddish-orange all over except for a large transparent spot before the end of the wings to dark reddish-brown; in this case the light spot extends clear across the wings, dividing the dark up into two parts.

The larvæ are yellow and brown in general imitation of the adult, the head and pronotum yellow, the rest of the body brown with a transverse band across the back of the wing pads and another across the abdomen.

They occur on the narrow-leaved willows, very commonly. The larvæ were found early in June, from which the males began to issue late in the month and the females by the first of July. The males soon after disappeared, the females remaining through the month.

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PEDIOPSIS SUTURALIS n. sp.

Form of *ferruginoides* nearly, bright-green with the the entire claval areas black, approaching *basalis* in size and ornamentation, but with a much more produced vertex. Length of ♀, 6 mm.; width, 1.75 mm. ♂ smaller.

Vertex little more than half the length of the eye, forming nearly a right angle in front, the center of the eye behind the middle of the vertex; front very flat, acutely angled above; pronotum finely wrinkled, nearly twice longer on middle than across the humeral angle to the eye, posterior margin shallowly emarginate, elytra long, roundingly angled behind.

Color: Bright green on face, pronotum and scutellum, a black stripe arising just back of either eye, widening backwards to the humeral angle, usually leaving a small green spot on the outer angle of the pronotum next the eye, the entire claval area of the elytra deep black, sharply and definitely bounded by the claval suture until just before the apex of clavus, when it crosses the suture and extends as a gradually narrowing stripe around to the tip of the wing, corium greenish on basal portion, hyaline beyond. Eyes reddish, propleura unmarked.

Described from one male and seven females from Ames, Iowa, and one female from the Van Duzee Collection (Colden, N. Y.)

Larvæ similar in form to those of *ferruginoides*, head very broad, transverse or slightly rounding; eyes prominent, thorax stout, convex; abdomen short, broad, dorsally carinate.

Color, green, a black stripe arising behind either eye as in the adult, but running back across the wing pads and along the abdomen just within the margin, widest near the end of the wing pads, where it curves out and becomes narrower on the abdomen.

The larvæ appear on willows about the first of June and even then show the unmistakable black line; adults from the first of July on into August.

Readily distinguished from other described species by its black dorsal shield. It might be mistaken for *basalis*, with the basal mark elongated, but for its sharp vertex.

PEDIOPSIS GLEDITSCHIÆ n. sp.

Form and color of *viridis* nearly, about one-third smaller, with a slightly shorter, rounder vertex, approaching *reversalis* in size but much

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darker green, propleura unmarked in either sex. Length, ♀ 4.5–5 mm.; width, 1.25 mm.; ♂ slightly smaller, darker.

Head compact, eyes small, a line across their centers cutting off less than one-third of the pronotum, vertex slightly, roundingly, obtusely angled, distinctly shorter than in *viridis*. Pronotum very finely granulated, posterior margin angularly excavated, disc strongly convex, depressed within and behind either eye, elytra moderately long, broadly and evenly rounded behind.

Color: Females, bright-green, the elytra hyaline at the tip; males, the head and pronotum green, the elytra clouded with brownish or dark fuscous, the costal margin green, scutellum yellowish or clouded with fuscous in the darker examples. Below, green in both sexes, the propleura without a black spot in either sex.

Described from numerous examples.

Larvæ very similar to *viridis*, short and stout, with transverse heads, thorax convex, shiny, abdomen broad, crested, each segment of the crest elevated into a flat curved tooth projecting backward and tipped with a hair; color, bright green.

Found exclusively on the honey locust along with *Macropsis*, the larvæ appearing in May and maturing before the middle of June, the adults throughout June and the first half of July. They are found at the base along the sides of the leaf stalks. This species might easily be confused with *viridis*, but the female is only as large as the *viridis* male while the males are still smaller and lack the spot on the propleura. Deeply-colored males have the elytra almost black instead of brown, as in *viridis*. These characters, along with the very distinct and constant difference in food plant and life history, leave no question as to specific identity.

PEDIOPSIS CROCEA n. sp. (var. *gleditschiæ?*)

Form of *basalis* nearly, smaller, with short, stout elytra which are scarcely longer than the abdomen and are inclined to be flaring behind as in *tristis*; bright saffron yellow, the elytra clouded with brown. Length, ♀ 5 mm.; width, 1.5 mm.; males smaller.

Head short, depressed, the pronotum very much elevated behind, the anterior margin depressed, obtusely angled before, the rugæ coarse and distinct, a median raised line. Scutellum very coarsely rugose, a triangular spot in each basal angle shagreened. Elytra strong, nervures distinct, lighter.

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Color: Face and pronotum bright saffron-yellow, scutellum light-yellow, sometimes with the basal angles clouded. Elytra clouded with brown, deepest on the claval areas and fading out to light-yellow before reaching the costal margin, sutural and humeral margins with a narrow saffron-yellow line. Below, light-yellow, claws brown, propleura unmarked. In two examples the elytra are scarcely clouded, being light-hyaline yellowish throughout.

Described from eight females and five males collected on honey locust at Lexington, Ky., by H. Garman.

Its occurrence on this food plant suggests identity with the preceding species, but aside from the striking and apparently constant difference in color (which might possibly be referred to fading or variability) there seems to be some differences in form of head and other details which, if in any degree constant, would be of specific value.

PEDIOPSIS REVERSALIS n. sp.

Allied to *punctifrons* but larger, in size intermediate between that species and *gleditschiæ*. Light-green, the male with two broad, black stripes across the face, tips of the legs, and a spot on the propleura black. Length, ♀ 4.50 mm.; ♂ 4 mm.; width, about 1.25 mm.

Head short, stout, more obtusely angled than in *gleditschiæ*, a line across the eyes scarcely cutting off a third of the vertex, vertex with much finer striations than in *punctifrons*, less excavated behind, the disc equally convex, but not as strongly pitted in front. Elytra moderately strong, venation regular, not strongly marked.

Color: Light-green, pronotum and face washed with yellow in the female, male with a broad black band along the upper margin of the face extending down to the middle of the front in a triangular point; below this, between the lower margins of the eyes, is a still broader black band, propleura with a round black spot, tips of the anterior pairs of tibiæ and tarsi annulate with black. In some of the males the band on the face is reduced to three black spots, one on the apex above and one just within and below each ocellus. The females are entirely unmarked except that in some cases the propleura has a faint spot.

Described from twenty-four males and twenty-four females collected from willows at Ames, Iowa, from the middle of June until into August, and three males from the Van Duzee collection from Colden, N. Y.

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This is the second American species of the spotted-face group so common in Europe, and represents the section in which the nerves are concolorous with the elytra, while *punctifrons* represents the colored nerved section. The spots on the male face are very variable, sometimes covering half the surface and again nearly wanting. The three males from New York are of this type, the spot on the propleura also wanting, as it is in a few of those from Iowa. A damaged female from Denver, Colo., is also apparently of this species.

IDIOCERUS ALTERNATUS Fitch. (Plate II., Fig. 1.)

This common species is slightly over one-fifth of an inch long with a broad head curving around the pronotum. The middle bears a large reddish-brown blotch, just outside of which, on top, there are two small black spots on a yellow band that extends to the eyes. The pronotum is reddish-brown and usually there is a white stripe down the middle. The wings are partly transparent, the veins being dark in some places and light in others, alternating, a light spot near the center of the median line.

The eggs are about one mm. long by about one fifth of a mm. wide, cylindrical, slightly curved, tapering gradually to a point at one side of the smaller end and cut off obliquely to an obtuse point on the opposite side at the large end. They are deposited in the young wood, near the tip of a branch, usually close to a bud, sometimes singly, more often three or four near each other. In either case the twig would enlarge at the spot and finally burst open and show the end of the egg in the seam. If many eggs were deposited in a twig, as was the case in the cage experiments, it usually died, while if only a few were deposited in a place, as was the case in the field, it sometimes continued to grow, though weak and distorted. The final result on the trees under observation was that over one third of the branches had their tips killed back or distorted, usually the main stem and larger branches being worst affected, probably owing to their more rapid growth in the spring, offering a more favorable place for deposition than the slow-growing side branches.

The larvæ are brownish with light rings or greenish with dark ones according to the amount of exposure of their position, in either case closely imitating the bark upon which they rest. The dark rings are made up of about twelve hair-bearing spots on the hind margin of each segment.

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Life History: The adults pass the winter under the leaves and rubbish in the woods, becoming active quite early in the spring. Some eggs were deposited before the middle of May and from then on nearly through the month. The first larvæ were found the last week in May, when a number hatched in the cases and a few were found in the field, the majority not appearing until in June, the egg stage lasting nearly three weeks in the breeding cage where the temperature was fairly constant, probably a little longer under the changeable spring weather out-of-doors. The larvæ burst through the projecting top of the egg and are quite active from the start. When first hatched they are nearly white except for their red eyes; the head is nearly twice the breadth of the body. Within a few days they become greenish in color and their body is much larger proportionately. The larvæ are abundant throughout June and well into July, the adults beginning to issue the first week, and from then on through the month, remaining abundant through August. The second brood was not as closely watched. The larvæ appeared early in September and the adults soon after, remaining abundant until cold weather sent them under cover.

IDIOCERUS MONILIFERÆ n. sp. (Plate III., Fig. 2.)

Form of *brunneus* nearly, more slender behind, resembling *alternatus* in appearance but lacking the fulvous shade and the dorsal white mark. Length, 5.50 mm.; width across eyes, 2 mm.

Vertex broad, shorter than the eyes; face convex; front less produced than in *brunneus;* narrow below; clypeus small at the base, much broadened on the truncate or slightly concave apex; genæ narrow, the margins concave, slightly reflexed below. Pronotum broad, disc nearly flat, humeral margin short, nearly straight, anterior margin broadly rounded. Elytra rather long, venation as in *alternatus*, outer anteapical cell long, parallel-margined, appendix broad, closely folded posteriorly when at rest.

Color: Vertex yellow, brownish fuscous between the usual black spots which are rather small, a median light line broadest at the base; face yellow, black above, omitting a yellow spot just outside the ocelli, and another above the antennæ; front yellow with a brownish circle above connected with an oval below; pronotum nearly irrorate with brownish fuscous on the disc, margins and a broad median stripe light; scutellum yellow, a spot within the basal angle black, a narrow median line forking at the suture, and two spots on the disc reddish-

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brown; elytra subhyaline, the nervures alternately black and white, white at base, an oblique black band across the center of the claval nervures and extending to the center of the costa, another from the apex of the clavus behind the nervures transversely to the center of the costa, apical nervures reddish-brown, the cross nervures between the first and second nervures broadly white.

Genitalia: ♀ ultimate ventral segment very short on lateral margins, roundingly produced and shallowly notched, pygofers short and inflated: ♂ valve broad, with a median acute tooth and sharp lateral angles.

Described from four females and one male. Larvæ and adults taken from cottonwood in July.

This species is very distinct and at once readily separated from other described species by the position of the white markings on the elytral nerves.

IDIOCERUS BRUNNEUS n. sp. (Plate III., Fig. 3.)

Form of *lachrymalis* nearly, but smaller, resembling the European *I. scurra* in form and color, but smaller and wanting the outer anteapical cell to the elytra. Cinnamon-brown with two black spots on the vertex. Length, 5.5 mm.; width across the eyes, 2 mm.

Vertex very broad and stout, eyes much more prominent than in *alternatus*, nearly half their width beyond the margin of the pronotum. Face very broad and short, front broad and very convex in both diameters, the outer margin of the genae concave, clypeus one-third longer than broad. Pronotum rather short, elytra broad, the appendix narrow, only slightly overlapping behind. Venation distinct, the nerves strong, thickly set with minute tubercles, outer anteapical cell wanting, the outer branch of the outer fork of the first sector curving away to the costa immediately, or at most forming a small triangular cell in the fork.

Color: Dull cinnamon-brown. Vertex and face tawny-yellow, a pair of black spots on the vertex and an olive brown area between them and extending nearly down to the dark ocelli, pronotum olive-brown, testaceous on the depressed spots behind the eyes, scutellum cinnamon-brown in the female, yellowish with three triangles on the base and two spots on the disc black in the male. Elytra brownish sub-hyaline, nervures brown, dark at apex.

Described from numerous examples.

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Larvæ very distinct, yellowish and reddish-brown, forms with stout bodies and broad roundingly transverse heads, the whole upper surface clothed with long coarse hairs. The abdomen is rather broad for this genus and there are about twelve hair-bearing tubercles in a row near the posterior margin of each segment.

Color: Head yellow, brownish in front; pronotum yellow, behind which there is a brown cloud and the margins of the abdomen are brown, broadest in the middle, the disc yellow.

Genitalia: ♀, ultimate segment about half longer than the penultimate, posterior margin broadly roundingly produced on the middle half, with an obtuse median notch, pygofers short, less than half longer than their width at base. ♂, valve long, posterior margin produced in an acute median tooth, plates short, stout, curved upward.

The cinnamon color and the simpler elytral venation render this a very distinct species in our fauna. It occurs abundantly on willows at Ames, and has been received from Nebraska. There are two broods in a season, one in July and the other in September, the latter hibernating and depositing eggs in the spring, which hatch out by the first of June.

IDIOCERUS MACULIPENNIS Fitch. (Plate II., Fig. 4.)

This is a very bright chestnut-brown species with light markings; the head is very short and the eyes curve around the pronotum and do not stand out as in the willow species. The face is light-yellow with a red stripe down the middle and two large black spots on the side above. There is a light spot on the pronotum, a v-shaped mark on the scutellum and another of the same color on the wings; the outer margins of the wings are very dark except for a white patch before the tip.

The larvæ are dark reddish-brown, sometimes blackish in color with broad, blunt heads and prominent eyes. They are very active and though readily seen, are very difficult to capture, dodging around a limb whenever approached.

They occur very commonly on hawthorn and crab apple trees, the larvæ appearing in May. The earlier ones mature by the middle of June and the last early in July; the adults common the latter half of June and nearly through July. The adults were again common the last of August and early in September.

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NEW SPECIES, DIMORPHIC FORMS AND EARLY STAGES OF JASSIDÆ.

DORYCEPHALUS VANDUZEI n. sp. (Plate VI., Fig. 2.)

Remarkably long and slender, ten times longer than wide, pale yellow with a greenish reflection. Form nearly of *D. baeri* but much longer, as long as *D. platyrhynchus* but much narrower, elytra much shorter than in either species. Length, 13–14 mm.; width, 1.25 mm.

Brachypterous form: Female, head long, foliaceous, three and one-half times the length of pronotum, nearly as wide as across eyes, very slightly narrowing before the obtusely rounding apex, apex very slightly elevated, a distinct median carina and a lesser one slightly nearer this than the eye on either side, the latter fading out anteriorly, ocelli on the margin before the eye. Front very broad and inflated on the clypeus, broadening to a point before the eyes, then narrowing slowly to near the apex of head, convexly inflated, obliquely ribbed, and thickly beset with coarse hairs on the sides; broadly, concavely, longitudinally depressed in the middle as in *baeri*. Clypeus broad, hairy, slightly longer than wide; genæ, broad at base below eye, then excavated to the lateral angles, which are almost rectangular. Pronotum one-half wider than long, two parallel longitudinal depressions near the middle, lateral margin parallel, carinated, anterior margin broadly shallowly emarginate, the lateral angles obliquely cut off against eye, posterior margin rather deeply angularly emarginate. Elytra short, reaching only to the base of the third abdominal segment, broad at the base, rapidly narrowing to the roundingly divergent apices, venation simple, claval veins united posteriorly, second sector forked near base, first sector forked near apex, apical cells small, irregular; abdomen long, broader than pronotum near base, tapering to the long attenuate pygofers; legs small, inconspicuous, fore and middle femora much dilated near base, their width equalling more than half their length.

Color: Pale straw-yellow with an iridescent greenish tinge especially noticeable on the vertex, a small black spot on the vertex just inside the reddish eye on either side, another on the middle of the posterior margin and a fourth on the median carina a little over one-third the distance to the apex, a small spot near apex of scutellum, four black spots on each abdominal segment arranged in two dorsal

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rows, another larger lateral one on the base of each segment on either side, forming a lateral row.

Genitalia: Ultimate ventral segment long, convex, the posterior margin very slightly produced on the middle half, pygofers remarkably long, extending beyond and entirely concealing the ovipositor, their acute tips compressed above, slightly divergent below, and fringed with fine hairs.

Described from two females collected at Little Rock, Iowa, July 1, 1897.

The genus *Dorycephalus* was founded on two female examples described as *D. haeri* from Southeastern Russia, and up to the present time the male has not been described. The only other species of the genus so far described, and the only one of which the life history or the male is known, is *D. platyrhynchus*. The examples of *D. vanduzei* were swept from high prairie land where the only grass with a stem apparently large enough to support them was *Sporobolus cuspidatus*. If the life history is similar to that of *D. platyrhynchus* these were the last of a brood, the males having all disappeared some time before. From our knowledge of the latter species it may be inferred that the males will be smaller, dark-colored and with a shorter head, long elytra and fully developed wings, and that there will also be a macropterous form of the female occurring in limited numbers and soon disappearing, while the brachypterous form, which is still clumsier than that of the *D. platyrhynchus*, probably rarely leaves the original host plant.

DELTOCEPHALUS IMPUTANS n. sp.

Form very similar to *albidus* or *reflexus*, vertex as long and even more sharply margined than in *reflexus*, creamy-yellow above with two small spots on the tip of the vertex and four dashes margining the reflexed veinlets, black. Length, ♀, 4mm.; ♂, 3.50 mm.

Vertex nearly half longer than wide, twice longer than against eye, acutely angled, disc flat or slightly depressed, margins sharp, tip thickened, slightly elevated, a slight transverse furrow just behind ocelli on the upper edge of the margin nearly one-fifth the distance from the eye to the tip. Front, similar to *albidus*, less than twice wider above than on clypeus, side margins nearly straight and continuous with those of clypeus, genæ rounding or but slightly angled. Pronotum two and one-fifth times wider than long, curvature of front margin, about half its length, posterior margin shallowly emarginate,

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the lateral margins short and oblique. Elytra short, slightly coriaceous, equalling the abdomen in length, flaring, appendix wanting, never overlapping at rest, usually parted by the elevated tip of the abdomen. Venation similar to *reflexus* on the corium, the two outer veinlets strongly reflexed to the costa, the third at nearly right angles and with the base of the apical cells forming a line across to the apex of clavus, outer anteapical cell small, pointed behind, sometimes wanting, the second cross nervure frequently wanting, veins on clavus nearly parallel, without cross nervures.

Color: Above, creamy-yellow tinged with olive. Vertex with the median black line extending nearly to the tip, a spot on either side of the white tip and a faint narrow line on the margin between these and the red ocelli, black, eyes reddish-brown. The three reflexed veinlets broadly white, margined in front with black which also extends along the costa the same distance before them, third apical with its outer margin broadly black. Below, face black, sometimes with a light spot on the apex of front sending off a narrow line curving around the loræ to the angles of the genæ; legs, femora black except tip, tibiæ and tarsi yellow, spotted or annulated with black, tergum and venter more or less infuscated.

Genitalia: ♀, ultimate ventral segment half longer than penultimate, two and one-half times wider than long, narrowing posteriorly to the slightly acute lateral angles, posterior margin, emarginate next the angles, broadly produced in the middle with an acute notch and a black spot either side, pygofers broad at base, constricted before the tip, their sides armed with stout spines. ♂, valve triangular, over twice longer than ultimate segment, nearly as long as broad, constricted near the base and again just before the produced apex, black, narrowly margined with light, plates narrower at base than valve, elongate, twice the length of valve gradually narrowing to the divergent rounding tips which are nearly half the basal width, pygofers inflated at base, flatly compressed at the apex and extending considerably beyond the plates.

Described from thirty-two examples collected at Ames, Iowa.

Larvæ, very similar to those of *reflexus*, lighter and less distinctly marked, light-brown with three stripes and the margins white, upper half of face dark, vertex twice longer in the middle than next the eye, acutely angled, disc flattened, body long, tapering to an acute point.

Color: A median stripe from the tip of the vertex to the tip of the abdomen, widening behind, a stripe on either side margining the eyes

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and extending back to the penultimate segment of the abdomen, and the broad lateral margins from the eyes back, white, the outer brown stripe on the abdomen is the darker and bears a row of hair-bearing white spots, one on each segment. Below white; eyes, the upper half of the face, a row of spots along the connexivum and spots against the spines on the hind tibiæ black.

Life History: A few adults were taken in July, no more being found until the larvæ which were found in August issued in September. From this it is probable they are two-brooded, adults issuing in June and again in August, the ones taken in July being the last of the spring brood. Larvæ and adults were both found exclusively on a *Muhlenbergia* probably *glomerata* growing in a sheltered but not shaded situation.

Readily separated from any other of the reflexed-vein group by its yellow color and absence of markings above, as well as by the genitalia. Its place is evidently between *reflexus* and *producta* Walk., (given as *bilineata* in the Synopsis) as in the latter species the second cross nervure is often wanting, in which case the venation is almost identical with *Scaphoideus*, and although these are unquestionably good *Deltocephalus* species it would seem to indicate a closer relationship for these genera than has been given heretofore.

Deltocephalus cruciatus n. sp.

Form of *signatifrons* nearly, but smaller, smaller than *weedi*, light-grayish with brown and white markings on vertex, forming a white cross on a brown field. Length, 2.75–3 mm.; width, 1 mm.

Vertex flat, width at base and length equal, two-thirds longer on middle than next the eye, apex nearly rectangular, margin either side nearly straight. Face longer than wide; front broad, wedge-shaped, twice longer than clypeus, less than twice wider above than below, clypeus large, margins continuous with those of front, genæ roundingly angled, broadly margining the loræ below. Pronotum less than half wider than long, equalling the vertex in length, anterior margin broadly curved, posterior margin nearly straight, humeral margins rounding nearly to the eye, elytra moderately long and narrow, equalling or exceeding the abdomen, with an appendix, venation nearly as in *signatifrons*, outer claval vein with a cross nervure to the suture near the base, central anteapical cell elongate, constricted, but not divided, outer anteapical small or wanting.

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Color: Vertex with brown spots leaving a light-yellowish marking as follows: A broad line on the anterior margin and extending back along the eye, a median light stripe broadest at the base, near which it gives off two branches which curve away to the middle of the eye; midway between these and the apex are two short projections at right angles, forming a Greek cross in white on a dark brown field. Front brown with light arcs, rest of the face light-yellowish with brown sutures. Pronotum yellowish-olive, irregularly marked with brown on the anterior half; sometimes four light olive stripes are evident. Scutellum yellow with black markings on the disc and inside the basal angles; elytra subhyaline, the nervures broadly white, margined inside the cells with fuscous except along the basal part of the costa; tergum black, margins yellow, below brownish.

Genitalia: ♀, ultimate ventral segment twice wider than long, anterior and posterior margin parallel, pygofers stout, moderately long. brown, with small white spots, each bearing a slender bristle: ♂, valve broad and short, rounding behind, plates broad at base, wedge-shaped to the truncate tips where they are one-third as wide as at the base, side margin straight, thickened, clothed with coarse white hairs.

Described from thirty-two specimens, Little Rock, and Ames, Iowa.

This species will fall in the second group of *Deltocephali* with *signatifrons* which it will follow; the outer anteapical cell is elliptical as in that species but smaller, sometimes wanting. It may be readily separated from *signatifrons* by the absence of the tooth on the female segment and the wedge-shaped plates of the male.

Deltocephalus obtectus n. sp.

Form and ornamentation of *D. weedi* nearly, lighter in color, vertex more produced, longer and narrower than *D. compactus*. Length 3–3 5 mm. Width 1–1.25 mm.

Vertex convex, point much produced, anterior margin strongly concave either side of apex, side margins oblique, length on middle equalling width at base. Face, width and length about equal. Front large, side margins convex, clypeal suture distinct, straight, half as long as width of front, clypeus broad, sides straight, genæ emarginate below eyes, outer angle strong but rounding. Pronotum as long as the vertex, twice wider than long, humeral margin strongly oblique, side margin short, anterior margin much produced between the large straight-margined eyes. Elytra exceeding the abdomen in length,

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rather narrow. Venation nearly as in *weedi*; inner claval nervure strongly arcuated, joined to the outer nervure by two cross-veins, one at the middle and another at the tip, a number of transverse veins between the outer claval nervure and the suture, central anteapical cell long, constricted in the middle and divided by a broad transverse vein, a number of irregular veins along the costa.

Color: Light grayish, maculate, with a broad interrupted crescent across the middle of the vertex and several spots on the anterior margin of the pronotum black. Vertex light-yellow, a transverse interrupted crescent across the middle of the disc, a narrow line extending back from the point of interruption on either side of a median impressed line, black, a pair of rectangular spots just inside the ocelli before the crescent, another longer pair just back of the produced white-tipped apex and a curved line on the margin either side of the apex, dark reddish-brown, a large irregular circle back of the crescent on either side brownish, ocelli red, broadly margined with white, eyes dark, their inner margin reddish. Face, brownish olive, with the suture darker and lighter arcs on the front. Pronotum grayish olive with an irregular black mark from behind either eye running towards the disc, and a concave row of points between the inner angles of the eyes black, scutellum light yellowish, a black spot just inside either basal angle and usually some markings on the disc, black. Elytra light, nervures broadly white, cells margined with fuscous, which is usually emphasized on the middle of the clavus, just inside the middle of the corium, and in three spots on the costal margin. Below, light in female, dark in the male, legs light, anterior femora annulate with black.

Genitalia: ♀ ultimate ventral segment, with an additional membrane as in *compactus* the outer one, half as long as its width at the base, the side margins rounding to the nearly truncate apex and disclosing the outer corners of the second membrane apex elevated over the base of the ovipositor and usually marked with dark: ♂, valve large, triangular; plates small, about twice the length of the valve, broad at the base, rapidly roundinglynarrowing to the produced attenuate points, margin with a few long light bristles; pygofers longer, the plates acuminate at the apex, densely clothed with coarse bristles.

Described from numerous specimens.

This neat little species is closely related to *weedi* and *compactus* and would fall between them in the synopsis. It may be readily separated from either by the absence of the reddish-brown color so characteris-

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tic of those species. In color it approaches *cinereus*, but is quite distinct structurally. The genitalia are quite distinctive and will readily separate it from either of the above named species.

DELTOCEPHALUS COLLINUS Dahlb.

Form of *melsheimeri*, nearly related to *D. monticola* but larger, larger than *melsheimeri*. Length, ♂, 3.3 mm.; ♀, 4 mm.; width, 1 mm.

Brachypterous form: Vertex flat, obtusely angled before, width and length about equal, slightly more than half longer against eye than on middle, anterior margin concave between the ocelli and the tip, the outline, however, obscured by the rounding front, front transversely convex, twice wider above than on clypeus, one-third longer than wide, clypeus half longer than wide, genæ scarcely angled below the eyes, broadly margining the loræ below and attaining the apex of the clypeus, pronotum two and one-half times wider than long, shorter than vertex, anterior margin broadly rounding, posterior margin shallowly emarginate, side margin short, not carinate. Elytra narrow, shorter than abdomen, the tips divergent from the apex of the clavus, reaching to the base of the penultimate segment, venation irregular, the apical cells minute or wanting, the two inner anteapicals large, outer very small or wanting. Wings proper, rudimentary.

Color: Green, with brown eyes and a grayish-olive vertex, vertex with a light median stripe enclosing the usual dark impressed line, a light stripe next each eye and a short one on the middle of face on either side, face olive-brown with dark sutures and light arcs, tip of rostrum black, anterior margin of pronotum light-green, posterior portion of disc darker, sometimes longitudinally striped with fuscous, elytra green, nervures lighter, tip hyaline, posterior margin of abdominal segments light green, disc green with slight fuscous markings, under side with a silvery sheen, disc of abdominal segments black, sometimes a median light line.

Macropterous form: Structural characters as in the preceding form, except that the side margins of the pronotum are shortened, allowing more freedom to the elytra. Elytra long, narrow, reaching the tips of the pygofers, margins nearly parallel, the tips obliquely rounding and slighly reflexed, giving the insect a linear aspect. Venation distinct, slightly irregular, discoidal cell formed by the branching of the first sector, long and narrow, outer anteapical cell very small, oval, apical cells large, the second one long, wedge-shaped, curved, usually a few

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irregular nervures running to the costa from the first sector, under wings as long as elytra, folded.

Genitalia: ♀, ultimate ventral segment twice wider than long, longest on the rounding lateral lobes, middle half of the posterior margin roundingly emarginate, with a median roundingly triangular tooth, emarginate portion four times the width of the base of the tooth, tooth and lateral lobes light, lateral margins of emargination sharply black, pygofers long, slightly exceeding the ovipositor, thickly beset with stiff bristles: ♂, valve triangular, twice wider than long, plates convexly widening from the base, then concavely narrowing to the obtuse, obliquely divergent apices; pygofers long, compressed, extending beyond the plates, their tips and sides studded with strong spines.

Described from numerous specimens swept from *Sporobolus* at Little Rock and Sioux City, Iowa, July 1–7, among which were six macropterous females. One macropterous female was received from Prof. Gillette and another is in the V. D. collection, both from Colorado.

The brachypterous form can not be confounded with any other described North American species. The macropterous form superficially resembles *melsheimeri* but may be readily separated by the genitalia, the extreme length of the abdomen or by the strikingly parallel appearance of the costal margins of the elytra. Though not agreeing in every respect with Fieber's drawings, yet on comparison of our specimens with European examples from Dr. Melichar it was found that no such differences existed, and it would seem that Fieber's drawings were not exact.

Deltocephalus obesus n. sp.

Form and appearance of *signatifrons* nearly, but with the vertex shorter and rounder and with a row of black spots on the anterior margin. Length of body, ♀ 2.75 mm., ♂, 2.25 mm.; width, 1.5 mm.

Brachypterous form: Vertex broad and short, width at base and length about equal, two-fifths longer on middle than at eye. Face broad, convex, broadest across antennal pits, rounding slightly above, more rapidly below to the narrow clypeus; clypeus nearly twice longer than broad, suture obsolete, genæ narrow, outer angles rounding. Pronotum broad and flat, more than twice wider than long, length equalling that of the vertex, anterior margin broadly evenly rounding, humeral margins straight, oblique, side margins distinct, carinate.

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Elytra short, half longer than broad, not quite covering the fifth abdominal segment, obliquely truncate from apex of clavus, the outer corner rounding, apical cells minute or wanting; wings rudimentary. Abdomen stout, ultimate tergite much enlarged. overlapping the pygofers, a deep transverse furrow before the posterior margin in the female.

Color: Grayish olive with indistinct brownish maculations above, all dark below; vertex, basal two-thirds olive brown with a large obscure brownish spot on either basal half, a brown line anteriorly margining a white spot against either eye and continuing faintly across the disc, a broad margin before this line yellowish white, with four dark spots in a row between the prominent reddish-brown ocelli. Front dark brown with light arcs and a light dash below, clypeus light yellow with a large brown spot on the disc below, rest of face light with heavy dark-brown sutures. Pronotum nearly unicolorous, in strongly marked specimens five longitudinal light stripes appearing. Elytra sub-hyaline, the nervures light with narrow fuscous margins, usually a dark spot behind the middle of the clavus, another behind the first cross-nervure on the corium, and a third one on the costal margin in line with the other two; abdomen black, last dorsal segment broadly yellow, with two approximate black spots near the anterior margin, pygofers black on base and sides above, apex yellow; below all black except legs, which are more or less yellow on the other margins.

Macropterous form differs only in that the elytra and wings are fully developed, exceeding the abdomen by one-half mm.: Venation; veins on clavus with only one cross-nervure, apical cells long, central anteapical cell long, divided, the posterior part entirely beyond the apex of clavus, outer anteapical narrow, giving off a costal veinlet at either end.

Genitalia: ♀, ultimate ventral segment moderately long, slightly narrowing on the sides, outer angles cut off obliquely, posterior margin truncate, but so strongly elevated in the middle behind as to appear to be angularly emarginate from the outer angles, pygofers short, stout, equalling the ovipositor, clothed with a few short spines; ♂, valve twice wider than long, rounding exposed part of plates scarcely as long as valve, their tips rounding half the width of the valve, side margins nearly straight, oblique, pygofers extending much beyond the plates, their tips armed with a whorl of long bristles.

Described from three macropterous and three brachypterous examples, two examples from Texas (Aaron), three from Orizaba, Vera Cruz (Osborn), and one from Arizona (Gillette).

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LONATURA n. g.

Head conical, slightly obtuse, more than three times wider across eyes than length on the middle of vertex, curvature of posterior margin about one-half that of anterior. Front two and one-half times wider than on clypeus, width and length about equal, clypeus broad, parallel-margined, thorax broad, distinctly angled within, genæ rather narrow, roundingly angled, extending very narrowly below loræ to clypeus. Pronotum scarcely as long as vertex, nearly truncate behind, humeral margin straight, nearly meeting the eye, which curves around the lateral margin. Abdomen normal in form, ovipositor very long in female, extending beyond the pygofers, occurs in two forms; macropterous with fully developed elytra and wings reaching well beyond the abdomen. Elytra long and narrow, the costal margin nearly straight, appendix large, venation obscure, veins on clavus nearly parallel, united by a cross-nervure, the two branches of the outer sector again uniting after the forking of the inner branch and then forming only two anteapical cells, of which the outer is the larger, inner three apical cells greatly elongate, as long as the anteapicals, outer two on the costal margin smaller; in this form the scutellum is very large and strong. *Brachypterous form* in which the elytra only cover the second abdominal segment and the wings are rudimentary, the elytra are twice wider than long, broadest at the apex, venation obscure, the inner branch of the outer sector forking again before the apex, forming a single closed cell. In this form the pronotum covers the base of the elytra and most of the scutellum.

LONATURA CATALINA n. sp. (Plate IV., Fig. 2.)

Form and general appearance of *minuta* V. D. nearly, occurs in two short and one long-winged forms. Length of body, ♀, 2.25 mm.; ♂, 1.85 mm.; width .9 mm. Length of macropterous form, 2.75 mm.

Macropterous form. ♀, vertex convex, the anterior margin rounding to the front, breadth at base and length about equal, over half longer on middle than next eyes, whole surface coarsely granulose, front very broad, transversely convex, sides rounding, rapidly narrowing just before the clypeus, clypeus parallel-margined, nearly half the length of the front, loræ subovate angled internally, genæ narrow, angles rounding. Pronotum scarcely as long as the vertex, half its length included in the curvature of the anterior margin, posterior margin shallowly emarginate, humeral margin scarcely oblique, disc pos-

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teriorly obscurely transversely rugulose, scutellum very large, broadly triangular. Elytra long and narrow, overlapping behind, apical cells greatly elongate, the apex of clavus scarcely farther from apex of scutellum than from the apex of the wing.

Color: Vertex and face obscure yellowish, ocelli and disc of eyes black, margin of eyes, pronotum, scutellum and elytra olive-buff, sometimes with a metallic-brown reflection; tergum dark; below light, except ovipositor, which is invariably black.

♂ slightly smaller than female. Color: Vertex and face yellow, pronotum and scutellum yellowish-brown, elytra a deep smoky-brown with a metallic reflection, abdomen black, legs smoky.

Brachypterous form: ♀, form as above nearly, except elytra, head slightly more pointed, pronotum longer, overlapping the bases of the elytra and scutellum, elytra short, truncate, twice wider than long, abdomen rather long, all but the first two segments exposed; ultimate dorsal segment longer than the preceding, nearly as long as the pygofers, which are exceeded by the ovipositor. Color entirely and uniformly lemon-yellow except for the ocelli, eyes and ovipositor, which are black.

♂, form of the preceding female, except for the much shorter abdomen, last dorsal segment not differing from others, pygofers above very short, tipped with a brush of coarse hairs, color entirely and uniformly orange-yellow, except for the black eyes and ocelli.

♂ var. Color: Vertex and face yellow, pronotum and elytra deep smoky-brown, abdomen brownish-black, legs and bristles on tip of pygofers yellow.

Genitalia: ♀, ultimate ventral segment over three times wider than long, posterior angles a little rounding, posterior margin shallowly emarginate with a short roundingly bilobed process usually wider than long, pygofers stout, two and one-half times wider than long, slightly exceeded by the black ovipositor. ♂ valve very small, posteriorly rounding, plates small, triangular, their apices narrowly produced, about twice longer than the valve, pygofers short, armed with stout bristles that equal the plates.

Described from numerous examples of all the forms from Burlington, Ames, Sioux City and Little Rock, Iowa, and from Yankton, S. D.

Larva: Form very similar to the brachypterous female, head slightly larger for the size of the body, body tapering regularly to apex of abdomen, wing-pads inconspicuous; color, light-yellowish, almost white during the first moult.

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Life History: This species appears to be confined to the species of *Sporobolus* that form mat-like patches of grass, and on these they occur in marvelous abundance. The larvæ appear before the middle of May and are similar in appearance to the short-winged females, nearly white when small, becoming a light lemon-yellow by the time they are full grown. From these larvæ both long and short-winged adults follow before the middle of June. The short-winged forms are the most abundant and remain through July, depositing eggs for the second brood. The long-winged forms only remain a few days on the spot where they issued, but disperse to start new colonies. The second brood of larvæ appear in July and become adult in August, remaining through the autumn. The long-winged forms seem to be fewer in fall than in spring.

This is the most remarkably polymorphic species of *Jassidæ* that has as yet been found, there being five distinct color variations, and two distinct structural types, these scarcely varying in the hundreds of examples studied. It seems remarkable that so abundant and interesting a species should have remained so long without notice.

LONATURA? MEGALOPA n. sp. (Plate IV., Fig. 1.)

Form and general appearance similar to *A. artemisiæ*, but differing in venation, markings and wing length; head bluntly roundingly pointed, yellow, with an interrupted black band before the eyes, pronotum and elytra grayish-olive, abdomen black with white rings. Length, 3 mm.; width, a little more than 1 mm.

Macropterous form: Vertex half the width of head, one-third wider than length on middle, twice wider than against eye, disc convex, sloping, anterior margin broadly rounding to the face, ocelli well over the margin not far from the eyes, face broad and short, front convex in both diameters, gradually narrowing with nearly straight margins to the loræ, then rounding rapidly to the long straight-margined clypeus, suture with clypeus distinct but not depressed, loræ narrow, genæ roundingly angled, rather broad below the loræ. Pronotum very little longer than vertex, very broadly rounding in front, twice wider than long, side margins strong, humeral margins rounding. Elytra more than twice longer than wide, overlapping behind with a distinct appendix reaching a little beyond tip of abdomen, sub-hyaline with broad light nervures narrowly but distinctly margined with brown, apex with

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a narrow fuscous band. Venation distinct, claval nervures nearly parallel, the outer one joined to the suture by a cross-nervure before the middle, inner branch of first sector joined to the second by two cross nervures, central anteapical cell elongate posteriorly, constricted in the middle and divided by a cross-nervure, posterior portion broadest, anteapicals on either side short, the inner one larger and diamond-shaped.

Color: Above grayish olive, nervures of elytra lighter with narrow brown margins, eyes black, vertex yellowish-olive; a medially interrupted transverse black band, widest at the margin, arises just before the eyes and above the white-margined ocelli; tip with two median black spots formed by the median light line and a yellowish transverse arc. Front brownish-olive with pale arcs, lower part of face decidedly yellowish, legs yellow, tergum and venter black, the posterior margins of the segments lined with white.

Brachyterous form: Structurally as above except that the elytra are scarcely longer than broad, truncate behind, only covering the third segment of the abdomen, the under wings rudimentary; the venation is nearly the same as on the basal part of the long wing, though it is cut off just back of the cross-nervure. In some examples there is a nervure just within the apical margin but no apical cells. Color as above with a slightly reddish cast; behind the elytra the abdomen is shining black with broad white margins to the segments.

Genitalia. ♀ ultimate ventral segment about three times wider than long, the lateral margin rounding in to the lateral angles, posterior margin shallowly excavated nearly its entire length with a broad truncate or slightly notched median tooth equalling the lateral angles, pygofers stout, not inflated, tipped with stout yellow hairs that exceed the ovipositor.

♂ abdomen rather long, valve broad and short, not longer than the ultimate segment, plates wider than valve at base, rapidly roundingly narrowing to the long attenuate points, margined with stout hairs, pygofer broad at base, short and rounding behind.

Described from nine males and thirteen females collected from a high knoll at Little Rock, Iowa, July 2d

This species does not appear to be strictly congeneric with *catalina*, but more nearly related here than to any existing genus. Its generic value seems still too uncertain to warrant the formation of a new genus.

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DRIOTURA, n. g.

Head short, transverse, obtusely conical, vertex over twice wider than long, anterior and posterior margin nearly parallel. Eyes large, two-thirds the width of the vertex, slightly wedge-shaped, broadest next the vertex, narrowing and curving back around the sides of the pronotum. Face broad and short, front narrowing to one-half its former width on clypeus, conically inflated and slightly reflexed onto the vertex above, giving the impression of a pointed vertex with the ocelli back of the margin as in *Tinobregmus*. Clypeus short, parallel-margined, genæ broad and strongly angled. Pronotum short, slightly longer than vertex, transversely striated on posterior two-thirds, posterior margin nearly straight, the lateral margin continuing around and below the eye as in *Jassus* without a lateral carina; abdomen short in male, much inflated in the female, suddenly narrowed to the long pygofers, which are considerably exceeded by the slender ovipositor. Legs stout. Elytra coriaceous, coarsely rugose, occurring in two forms:—*brachypterous*, in which their truncate tips scarcely cover the second segment of the abdomen, as wide or wider than long, the costal margin being curved around under the abdomen, extending broadly below the line of the eyes, anterior margin covered by the pronotum, —in this form the wings are rudimentary:—*macropterous*, in which they extend nearly to the tip of the ovipositer, broadly rounding behind. In this form the wings are fully developed and the pronotum is emarginate at the humeral angles, allowing freedom of motion to the elytra.

DRIOTURA ROBUSTA n. sp. (Plate IV, Fig. 4.)

Brachypterous form: Size and form of *D. gammaroidea* V. D. nearly, slightly smaller and with longer vertex, mottled-gray with a transverse light band on pronotum and another on face. Length, ♀, 3–3.5 mm.; ♂, 2.75 mm.; width, 1.25 mm.

Vertex narrow, transverse, nearly parallel-margined, twice wider than long, anterior margin rounding on the sides, confused with the produced front in the middle, surface finely granulated, eyes triangular, laterally narrowing and curving around the pronotum; face broad, rounding, moderately short; genæ broad, their outer angles distinct; front parallel-margined above, then regularly narrowed to the clypeus, broadly produced above and confused with the vertex; clypeus parallel margined, slightly longer than broad, loræ regularly rounding, as

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wide as the clypeus. Pronotum short, nearly four times wider than long, posterior margin nearly straight, slightly medially emarginated laterally, broadly rounding below and behind the eyes, touching the genæ, posterior two-thirds finely transversely striated, anterior margin finely granulated. Scutellum very small, tumid, triangular. Elytra coriaceous, coarsely shagreened, nearly square, convex, the costal margin extending down and around the pleura, anterior margin entirely concealed by the pronotum, venation obscure, apparently consisting of about eight nearly parallel slightly oblique nervures, the outer one forked beyond the middle, a broad space between it and the thickened costal margin, the third nervure from the inner margin just attaining the inner posterior angle and probably representing the claval suture. Abdomen broad, convex in both diameters, and in the female rapidly narrowing posteriorly to the narrow pygofers, which are roundingly emarginate above to receive the exserted attenuate ovipositor.

Color: Vertex with variable markings of light-yellow and black; usually the following light markings may be made out: A narrow arcuated transverse line marking the boundary of the vertex and front, a median longitudinal line, a line on the posterior margin of vertex and bordering the eyes behind, an irregular line running forward from the posterior margin just inside the eye and a small spot in the middle of the disc on either side. Face light above with several concentric dark arcs, which deepen and coalesce below, forming a dark band which includes the antennal pits, below this a broad transverse light band including the apex of front and the superior half of the clypeus, and extending around on the genæ under the eye to join the band on the pronotum, the apex of clypeus, a small spot in each basal angle, the facial sutures and the lower margin of the genæ dark. Pronotum with the anterior third irregularly black, the remainder consists of a transverse light band which runs down on the lateral margin to connect with the light band on the face. Elytra, with the nervures and numerous irregular ramose lines connecting them, light, the interspaces dark with finely maculate effect. Abdomen finely maculate, darker than elytra, below dark fuscous to black, ovipositor and spines on tibiæ reddish.

Genitalia: ♀, ultimate ventral segment twice longer than penultimate, posterior angles rounding, posterior margin nearly straight, sometimes medially elevated, pygofers long, wedge-shaped, much exceeded by the narrowly compressed oviduct, which is over half the

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length of the abdomen. ♂, valve short, rounding, sometimes almost concealed by the broad ultimate segment, plates broad at base, the inner margins rounding, outer margin emarginate and impressed near the middle, tips obtuse, widely separated.

Described from eight examples from Sioux City and Little Rock, Iowa, collected by the authors, and four examples from Colorado, received from Prof. Gillette.

Larva: Similar in form to adult, reddish-brown with light markings, a light band on the face as in adult and another on the fourth abdominal segment, vertex slightly longer and more angled than in the adult, reddish-brown irregularly maculate, usually a pair of light spots between three dark ones on the anterior margin and a lighter spot against either eye, pronotum dark-brown with the anterior margin irregularly light, wing-pads brownish with a light spot just inside the posterior angle. Abdomen reddish with four longitudinal rows of light-colored bristle-bearing papillæ, transverse light bands occupying fourth segment continuing obliquely backward under the margin on either side of the seventh. Below, dark, a transverse light band on face below eyes as in adult; legs dark brown or black, fore and middle tibiæ and a narrow line including the spines on posterior tibiæ yellow.

Life History: The species is probably two-brooded as larvæ and freshly issued adults were collected the first week in July, and larvæ again late in the fall, indicating a life history very similar to that of *gammaroidea*.

Driotura gammaroidea V. D. (Plate IV, Fig. 3.)

Short compact form with a bluntly conical head, stout body and a broad convex abdomen, in the female tipped with a long exserted ovipositor. Length, ♀ 3.5–4 mm; ♂, 3 mm. Width, 1.25–1.5 mm.

Brachypterous form: Vertex twice wider than long, the anterior margin slightly more convex than the posterior; front obtusely convexly inflated above, not so strongly as in *robusta*, ocelli distinctly on the dorsal aspect; clypeus oblong, parallel-margined, medially carinate on the basal portion; eyes wedge-shaped, narrowing outwardly; pronotum short, transverse; posterior margin nearly straight and overlapping the elytra, lateral margin compressed anteriorly beneath the curvature of the eye, posteriorly broader and extending around to the genæ below. Elytra coriaceous, coarsely rugose, convex, their costal margin enclos-

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ing the pleura, together much wider than long, widening back from the pronotum to their roundingly truncate tips which scarcely cover the second abdominal segment. Abdomen beyond elytra very broad, convex, rapidly tapering posteriorly.

Color: Usually entirely glossy black, except the spines on tibiæ, reddish-brown, sometimes a narrow line on posterior margin of the pronotum, a somewhat broader one in front of the ocelli, the legs and the ovipositor in the female reddish-brown.

Brachypterous var. flava differs from above in color as follows: elytra, last two abdominal segments, genitalia, legs and sometimes the facial suture and a narrow margin around eyes, bright tawny yellow.

Macropterous form: Thorax much stronger, the pronotum with the lateral margins shorter from the emargination of the humeral angles, allowing greater freedom to the elytra, eyes less recurved laterally. Elytra fully developed, reaching nearly to the top of the exserted ovipositor, widest before the middle, the costal margin rapidly narrowing to the humeral attachment, coriaceous in texture obscuring the apparently weak venation except for the inner apical cells, which are subhyaline with straight dark nervures; wings fully developed, as long as the elytra.

Color: Black, ovipositor and legs tinged with reddish-brown.

Genitalia: ♀, ultimate ventral segment parallel margined, two and one-half times wider than long, disc slightly convex. pygofers long, wedge-shaped, ovipositor slightly longer than in *robustus:* ♂, valve broad, rounding; plates broad at base, broadly convexly pointed, divergent from the base, outer margin medially impressed.

Specimens of both brachypterous forms are at hand from Wyoming, Colorado, Kansas, and Iowa; of the macropterous forms from Iowa only.

Larva: Form of the adult nearly, vertex slightly more pointed, depressed either side middle of the disc posteriorly, a transverse impression before the eyes, facial sutures and two anterior pair of tibiæ sometimes reddish, abdomen with moderately coarse bristles, legs stout.

Life History: The species occurs only on the wild grasses of the higher prairie land, is two-brooded, the first brood appearing in early spring from larvæ that have hibernated, larvæ again appearing in June; second brood adults in July and August, larvæ again appearing in the fall, becoming nearly full grown to pass the winter.

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ATHYSANUS CURTISII Fitch. (Plate V., Fig. 1.)

The life history of this species was outlined in the *Life Histories of Jassidæ* (Proc. Ia. Acad. Sci., IV., p. 221), but the figures presented at this time will be of service in comparing the different species.

ATHYSANUS BICOLOR Van D. (Plate V., Fig. 2.)

The life history of this species has also been discussed with that of the preceding species, but some details of life history remain to be determined. The figures will serve for comparison with related forms.

ATHYSANUS STRIATULUS Fall. (Plate V., Fig. 3)

A rather slender species with long wings reaching well beyond the abdomen, about one-sixth of an inch to the tip of the wing in the female, the male being shorter and much smaller, testaceous-brown with dark markings on pronotum and wings, head shorter than pronotum, markings arranged in about three interrupted rows, sometimes obscure.

The larvæ are narrow brownish forms with a slightly more pointed head than the adult, the dark markings are nearer the margin except two spots near the base; there is a row of spots across the pronotum, two pair of large spots on the wing-pads and a smaller pair between the posterior ones.

This species is found abundantly over the prairie grass areas in different parts of the state. The larvæ were found very common the last of May and on into June. The males began to appear by the middle and the females a week later; the males disappeared by the second week in July, the females remaining until into August, the eggs having been deposited before the end of July.

ATHYSANUS STRIOLA Fall. (Plate V., Fig. 4.)

This species somewhat resembles the preceding in size and the striations of the head, but is otherwise quite distinct. The head is much broader than the body, which tapers back to the narrow tip of the wings.

Color: Green tinged with yellow, a narrow black line across the head between the ocelli and the margin black, sometimes a curved line on the pronotum dusky.

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The larvæ are olive-brown with markings almost as in the adult, the head is more strongly pointed and there are two dots between the black spot and the margin and two more against the eyes.

This species occurs only in low swampy places; a few full-grown larvæ and an abundance of adults were found the middle of August on a low swampy meadow where a species of *Juncus* abounded.

ATHYSANUS EXTRUSUS V. D. (Plate VI., Fig. 1.)

Short and stout, over one-fifth of an inch long and nearly half that wide, head short, no longer than the pronotum, wings shorter than the body in one form which does not fly, longer with the under wings more fully developed in the other form which flies readily.

Color: Brownish-yellow to dirty straw, usually with four irregular dark marks on the head; the males are somewhat smaller than the females and have a pair of long strap-like styles extruded from the abdomen behind.

The larvæ are stout, active forms, yellowish with reddish and fuscous markings on the head and four rows of white spots on the abdomen; the legs and body are sparsely clothed with long, stiff hairs.

Life History: They are found only in shaded locations, occuring most abundantly in a rich bottom-land pasture where the underbrush had all been cleared out, leaving only the larger trees; here the larvæ were found January 1st less than one-third grown; the day was warm and they were very active. They were again observed the first of April. Spring had fairly opened up and they were a little larger than when observed in the winter. They mostly moulted April 6th and again April 14th, the first adults appearing about the first of May, these being males; the females began to appear a week later, and by the middle they had all issued. The adults were abundant from then until into July. Frequent examinations showed that the eggs were not deposited until late in June or on into July, from which the larvæ hatch late in the fall and pass the winter.

ATHYSANUS TEXANUS n sp.

Somewhat resembling *colon* in ornamentation, slightly narrower, pale yellow with two black spots on anterior margin of vertex behind which are two broad parallel red stripes extending back across pronotum and

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scutellum and three pairs of oblique ones on the elytra. Length 5 mm., width 1.75 mm.

♀ vertex narrower than in *colon*; length equalling three-fourths the width, side margins parallel, one-eighth longer at middle than at eye, disc flat, a straight transverse impression before tip, acutely angled with face, front broader than in *colon*, margins gradually roundingly narrowing to the parallel-margined clypeus, outer angles of genæ rounding, margin below nearly straight. Pronotum half longer than vertex, posterior margin long, humeral margin short and strongly oblique, lateral margin rather long, somewhat thickened, anterior margin more produced than in *comma* or in *colon*. Elytra three times longer than wide, the margins nearly parallel, venation indistinct near base, strong at the apex, pattern similar to the macropterous form of *colon* slightly irregular in the anteapical cells, outer anteapical cell very long, narrow, somewhat curved, at least three-fourths of its length projecting beyond the apex of clavus, central anteapical still longer, curved, constricted in the middle, sometimes divided, inner anteapical not extending much beyond clavus, inner apical margin oblique, first apical cell elongate, narrowly margining the costa; second, length and breadth nearly equal, set obliquely against the outer corner, the margining nervures curved, parallel.

Color: Pale yellow, a narrow line on the anterior margin of the vertex, a spot either side of the tip, a curved mark on the costal margin of elytra behind the middle, a spot on the second apical, and the posterior margin of the central anteapical cell black, two broad stripes parallel across vertex, pronotum and scutellum, and three pair on the elytra parallel with the claval suture, the inner pair continuous with those from the scutellum, bright red; face dark brown, the sutures and outer margin of the genæ light-yellow, a black spot on the genæ above the loræ; legs pale, lined internally with black; tergum black on disc, margins yellow, penultimate segment yellow with a black median line, ultimate one with a median and two lateral lines black, pygofers yellow with a small black spot above.

Genitalia: ♀, ultimate segment with the lateral margins suddenly narrowed from near the base, then roundingly produced, the posterior margin with three obtusely-rounding lobes, produced part of nearly equal length and breadth; from under the emarginate angles arise two lateral membranes, resembling acutely produced lateral angles to the segment.

Described from six examples from Texas (Aaron).

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ATHYSANUS PUNCTATUS n. sp.

Superficially very strikingly resembling *obtutus* in form and color but with a shorter head, large spots placed further apart and the ovipositor not exserted. Testaceous with two black spots on the vertex just within the ocelli. Length, macropterous form, 3.5 mm.; brachypterous form, 2.50–2.75 mm.; ♂, 2.50 mm.

Macropterous form: ♀, vertex one-fourth wider than long, two-fifths longer on middle than next the eye, sloping, rather roundingly angled to the front. Front transversely convex, nearly parallel-margined to the antennæ, then roundingly narrowed to the clypeus, clypeus about half longer than wide, suture indistinct, genæ much longer below angle than in *obtutus*. Pronotum four-fifths wider than long, strongly rounding in front, side margins very short, posterior margin short, shallowly excavated, rounding to the long oblique humeral margin. Elytra twice longer than broad, overlapping at apex, apex nearly truncate, the outer angle rounding, the base of the apical cells equalling the tip of the pygofers. Venation weak and indistinct, appendix short, four broad apical cells and one long costal one, under wings fully developed.

Brachypterous form: ♀, elytra short and broad, reaching to the sixth abdominal segment, their tips shortly rounding from both sides, venation weak, the apical cells small and inconspicuous or wanting, under wing reaching the third or fourth segment, pygofers armed with a brush of stiff hairs.

Color: Light testaceous, vertex a little more yellow with two large round black spots on the anterior half, their diameter being about one-third the width of the vertex; before and between these on top of the vertex are two reddish-brown points. Eyes black, face and legs light testaceous. Pronotum testaceous, scutellum with a yellowish cast. Elytra sub-hyaline with a reddish metallic reflection, the black abdomen partly visible, ultimate dorsal segment broadly tipped with white, penultimate one narrowly so, venter black.

Genitalia: ♀, ultimate ventral segment scarcely twice wider at base than length on middle, the sides roundingly narrowing, posterior margin broadly rounding, a flat elevated area in the middle. Pygofers rather small, scarcely inflated, oviduct very stout, little if at all exceeding the pygofers. ♂, valve broadly triangular, twice wider than long, plates broad at base, regularly concavely narrowing to the acute points, two and one-half times the length of the valve, pygofers

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inflated at the base, then compressed to the acute edge, equalling the plates.

Described from four females and two males swept from *Sporobolus*, Little Rock, Iowa, July 1st, and one female taken at Ames, Iowa, August 9th, and two females from Colorado through the kindness of Prof. Gillette.

ATHYSANUS DENTATUS n. sp.

Size of *punctatus*, nearly, stouter, vertex nearly flat, wings covering the tip of the ovipositor, light testaceous, two dark spots on the scutellum and two wavy transverse lines on the head. Length, 2.75–3 mm; width, over 1 mm.

♀, vertex one-fifth wider than long, obtusely angled before, disc flat, anterior margin rounding; front long and rather narrow, the sides straight, slightly narrowing; clypeus slightly broadest at base, little longer than broad, narrower than apex of front; loræ broader than clypeus, angled internally; genæ, margin straight either side the distinct angles. Pronotum more than twice broader than long, obtusely rounding before, the posterior margin nearly straight, humeral margin rounding nearly to the eye. Elytra not quite twice longer than wide, their rounding tips inclined to be flaring, without an appendix, never overlapping. Venation of the normal *Athysanus* type, the apical $cell_5$ nearly square.

Color: Obscure yellowish or reddish-brown, vertex lemon-yellow, an irregular brownish line bordering an *X*-shaped figure as follows: commencing just before the back margin against either eye running in one-third the distance to the center, then throwing a loop forward one-third the distance to the ocelli, between these loops margining a perfect X resting on the posterior margin of the vertex, the separation of its bases being a black median line; another wavy line on the anterior margin connecting six dots as follows: one on either side of the tip, and a pair on either side of these, dividing the distance to the eyes on a line slightly above the ocelli; face yellow, sutures, apical portion of clypeus and the tips of the loræ strongly marked with brown, front with a broad median line widest below, and about eight lateral arcs, the upper pair very strongly arched above, second pair reduced to spots beneath the arches. Pronotum testaceous on the disc, anterior margin yellowish, behind which there are a few brownish spots, of which the inner pair is the most distinct; scutellum soiled yellow,

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transverse impression and a pair of approximate spots on the disc in line with the two other pairs on the anterior margins of pronotum and vertex. Elytra sub-hyaline soiled yellowish-brown. Tergum and venter black, margins yellow.

♂, face and all below very dark, a few light arcs on the upper part of the front, vertex very dark, an irregular spot on the tip, a ring around the ocelli and the "X" light, pronotum and scutellum heavily marked with fuscous brown, elytra dark, the nervures lighter.

Genitalia: ♀, ultimate ventral segment broad on basal third, beyond this the lateral margins are sharply constricted and the whole surface depressed, lateral angles produced, forming acute teeth, nearly half as long as the width of segment at base, posterior margin deeply emarginate between these teeth, forming two smaller rounding or obtusely angular teeth separated by a median notch. Pygofers inflated, slightly exceeded by the stout ovipositor: ♂, valve very large, triangular, the apex slightly produced, plates much enlarged, broad at base, where they are convex, extending beyond the valve about half its length, without narrowing, their truncate tips standing nearly perpendicular to the plane of the valve, and together with the short pygofers forming an enclosed cavity, spines on pygofers stout, rather long, extending down outside the plates.

Described from eight females and one male from Colorado, one from Van Duzee collection, three from Prof. Pammel, and four females and one male from Prof. Gillette.

EUTETTIX SCABER n. sp.

Form of *lurida*, dark, fulvous-brown above, with a large angular area on the outer base of the elytra. Length, ♀ 6.5 mm; ♂ 6 mm. Width, 1.75 mm.

Vertex parallel-margined, over three times wider than long, transversely depressed back of the rounding margin, front broad, wedge-shaped, longer than in *lurida*, the clypeus hardly widened at the tip, genæ with the outer margin rounding. Pronotum broad, convex, highest behind, the humeral margin straight, parallel with the margin of the scutellum. Elytra broad, only slightly overlapping behind, nervures indistinct.

Color: The vertex reddish-brown anteriorly with five white spots confluent with the margin, posteriorly with two white spots just before the margin slightly nearer each other than the eyes, face light-yellow, a black spot against the outer margin of the loræ, pronotum and

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scutellum chestnut, finely irrorate, two white spots on the scutellum against the ends of the transverse depression and another at tip; elytra heavily irrorate, almost clouded with dark chestnut, except for the outer margin of the basal part of the clavus the entire basal half of the corium, and an indistinct transverse band just before tip strongest on the costal margin. The basal part of corium is hyaline yellowish, oblique behind, bordered above by a narrow white line on the margin of the clavus and extending forward across the lateral margin of the pronotum to the corner of the eye; below yellowish.

Genitalia: ♀, ultimate ventral segment moderately long, lateral angles rounding, posterior margin slightly produced and feebly notched in the middle, pygofers much longer than in *lurida*, obscure yellowish with brown spots: ♂, valve rounding, plates triangular, twice the length of the valve, their margins clothed with long hairs.

Described from three females and one male, collected at Ames, Iowa; two of them swept from white oak.

EUTETTIX CINCTA n. sp.

Eutettix jucundus,* VanDuzee. . Psyche, VI., p. 307, 1890; Osborn, Proc. Iowa Acad. Sci. I. pt. 2, p. 120, 1892.

Size of *scaber* nearly, elytra narrow and vertex pointed. Dull reddish-brown with an oblique obscure saffron band before the middle of the elytra. Length, ♀, 6 mm.; ♂, 5.25 mm.; width, 1.60 mm.

Vertex strongly rounding, one-third longer on middle than next to eye, disc flat with transverse depressions just behind the rounding margins; face long, more acutely angled than is usual in this genus; front narrow, nearly twice longer than broad, margins straight; genæ parallel-margined below the eyes, distinctly angled. Pronotum short, one-half its length included between the eyes, transversely striated except for the depressed anterior margin. Elytra rather narrow, compressed behind. Venation; veins on clavus approximate before the middle; anteapical cell usually divided, anterior portion small, nearly circular, the posterior portion narrowing behind; apical veins curved, usually another small round cell behind the central anteapical, about five transverse veinlets on the apical half of the costa.

Color: Vertex and superior third of front, soiled-yellowish, ocelli margined with red, remainder of the front rusty-brown, the rest of face

* The *Jassus jucundus* of Uhler listed by VanDuzee as *Eutettix jucundus* is, as later suggested by VanDuzee, a *Paramesus* near *twiningi*, and the species of *Eutettix* upon which the reference was made has been hitherto undescribed.

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darker; pronotum soiled-yellowish irrorate with brown. Scutellum light-yellow; four spots in a row, two on disc and two on margin and two just before apex on margin. Elytra milky, washed with yellowish, the nervures red; an oblique dark-brown band behind the middle, composed of blotches occupying the central portions of the cells, a white spot just before the middle of the central anteapical cell, a transverse median band on the clavus and the broad bases of the costal and outer apical nervures black, all of third and basal half of first joint of posterior tarsi white, the rest black.

Genitalia: ♀, ultimate ventral segment rather long, slightly produced in the middle, the outer angles rounding: ♂, valve nearly concealed by the ultimate segment; plates broad at base, one-half longer than wide, the margins slightly concave, thickly set with coarse bristles.

Described from numerous examples of both sexes collected at Ames, Iowa, two specimens from Texas (Aaron), and one from Washington, D. C. (Heideman).

EUTETTIX MODESTA n. sp.

Form of *lurida* nearly, small, vertex and scutellum yellowish, pronotum and elytra fulvous with a narrow parallel-margined transverse light band before the apex of clavus. Length, ♀, 5.5 mm.; ♂, 4.5 mm. Width, 1.5 mm.

Vertex short, broadly rounding, parallel-margined, disc flat, sloping, striate, the striations converging towards the apex, behind which there is a short transverse depression; face convex, rounding to the vertex; front three times wider at base than at apex, margins slightly rounding; genæ rounding. Pronotum large, transversely striate, humeral margin straight, meeting the eye below the middle; elytra long, slightly flaring, but overlapping behind; venation rather obscure, a number of irregular reticulations near the apex and along the costa, a second transverse nervure present.

Color: Vertex and face yellow, a small black spot on the outer margin of the loræ; pronotum yellow, coarsely irrorate with fulvous on the disc posteriorly; scutellum yellow, two small approximate spots on the disc pale reddish-brown, a triangular spot within each angle, light-olive; elytra with a narrow transverse yellowish subhyaline band midway between the apex of the clavus and the apex of the outer claval nerve, the rest of the elytra clouded with dark fulvous brown

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strongest against the light stripe and fading out on the base and along the costal margin, nervures and ramose lines reddish on the lighter parts, apex of claval nerves and a pair of round spots between them, white.

Genitalia: ♀, ultimate segment nearly three times wider than long, posterior margin concave with a broad, truncate, or slightly notched median tooth; pygofers about three times longer than the segment, stout, yellowish with brown spots on the bases of the spines: ♂, valve long, rounding behind with an acute median tooth; plates broad, slightly narrowing to the broad almost truncate apex, disc convex, margins with long hairs.

Described from one male and one female swept from second growth oaks, Ames, Iowa. A very neat and distinct species.

PHLEPSIUS ALTUS O. and B. (Plate VI., Fig. 3.)

This species, described in our previous paper (Proc. Ia. Acad. Sci., Vol. IV., p 228), has been taken during the summer of 1897 very abundantly at a number of points in the northwestern part of the state as well as at Ames.

This is a shorter and stouter species than *irroratus*, with a shorter, rounder head and broader wings, which are usually flaring at the tip. The head is only a little longer in the middle than next the eyes, about half the length of the pronotum. General color, dark reddish-brown, from the innumerable fine lines and spots on a light ground, a number of clear white spots on the wings and a row of alternate white and black spots on the outer margin. The species of this genus are very much alike in color and it is only by careful study of structural characters that they may be accurately separated. The short, broad form of this species, however, separates it from most of the species occurring here.

The larvæ are very broad and short, even more so than the adult, the head being longer proportionately. They are of a dark grayish-brown, sometimes with a reddish cast, being in fact dirt-color as near as it can be imitated.

They are found in abundance wherever *Bauteloa hirsuta* occurs. In Iowa this grass is only found on very high prairie land, usually capping the tops of the hills, so that this species has a somewhat local distribution. Further west where the grama grasses form a large share of the grazing this species may be expected to occur very generally.

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The species is single-brooded, the larvæ appearing by the middle of May, as small, almost round, gray specks clustered on the ground around or in among the stems of the grass clump, springing a foot or more away if disturbed. Towards the last of June they become full-grown and may be found on the ground under the edge of the grass clump, so closely resembling the dirt and rubbish as to be hardly discernable. The adults appear the last week in June and the first week in July, and remain in decreasing numbers through August.

PHLEPSIUS NEBULOSUS V. D. (Plate VI., Fig. 4).

Very similar in form and color to *irroratus*, but much larger, being about three-eights of an inch long and about one-fourth that broad; the head is broader and less pointed and much thinner on the edge.

The larvæ are very broad and flat, with longer and flatter heads than the adult, the abdomen tapering to a sharp point, clear creamy-yellow with innumerable fine brown points arranged in wavy lines, a light stripe down the middle and three rows of spots on each side of the abdomen, the outer row with black margins, the eyes are dark red and there is a dark spot on either side of the tip of the head.

Nearly full-grown larvæ were found the third week in June in clumps of switch grass (*Panicum virgatum*) feeding upright on the broad stems which they resemble in color. Placed in the cage they issued as adults about the first of July. Adults were taken from the last of June through July, seeming to stay closely by low ground where the grass occurs.

ERRATA.

Page 60, line 2, for "2.25" read "1.25."
Pages 70 and 73, for "Plate II." read "Plate III."
In part of edition, on page 65, "*elaeta*" should read "*laeta*."

The plates accompanying this paper have been drawn from nature by Miss Charlotte M. King under the personal supervision of the authors. They are used in this connection by courtesy of the Iowa Experiment Station.

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NOTCHED BONES FROM MEXICO.

BY FREDERICK STARR.

AN interesting paper, forming article V of volume X of the *Bulletin of the American Museum of Natural History*, has just appeared under the title of *Marked Human Bones from a Prehistoric Tarasco Indian Burial Place in the State of Michoacan, Mexico.* It is the production of Carl Lumholtz and Aleš Hrdlička. In it are described, with much careful detail, twenty-six human bones marked with transverse notches, found at Zacápu, in Michoacan. They were found associated with skeletons. Mr. Lumholtz thinks these specimens are to be understood from the idea that possession of any part of a human being gives power for sorcery over him and from the notion that power is latent in the bones of the dead. He summarizes his theory in this statement: "I believe that the marked bones of this Tarasco burial-place were the bones of enemies, kept as amulets or fetishes and buried with the dead warrior who procured them. Their possession meant to the conqueror the strength of the subdued man, as a sign of which he placed the transverse marks on them, symbolic, perhaps, of the count of the dead man's days. The extraction of the marrow would further help to make the fallen enemy a prisoner of the victor, by eviscerating the bones and robbing the ghost of his last independent mortal power."

It is Dr. Hrdlička who makes the detailed examination of the specimens. After presenting the results of his minute study, he says: "The bones were trophies from fallen enemies and the grooves signified the number slain by the owner of the bones. . . Or, the grooves may have served the *rôle* of simple records of age, of great feasts, or of other events. . . Or, finally, the bones may have served some as yet undetermined religious or ceremonial purpose." The above quotations amply show the conclusions reached by the authors mentioned.

I have in my possession probably thirty-five or forty specimens of such notched bones. I intended to publish nothing concerning them until my *Manual of Mexican Archæology* should appear. It seems, however, proper at this time to present a preliminary paper upon the subject. My specimens are all from one site, not far from the city of

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Toluca, in the State of Mexico. Some of the specimens found were donated to the State Museum at Toluca; others are yet unpacked; twenty-one, however, are available for immediate examination. The first of these specimens were dug out early in 1895; the rest have been taken out at various times since. They were associated, like the Michoacan specimens, with human skeletons. Like those described by Lumholtz and Hrdlička, they are all long bones. Among them are 14 femora, 2 humeri, 5 tibiae. That this material may be available for study and reference, I present in tabulated form the data, yielded by its examination. Anatomical data are omitted as hardly relevant to our question.

In this table the bone is considered as divided into parts from above down: where the third fourth is said to be occupied with notches, it is the third fourth counting downward. The average separation is given by the measure from the middle of one notch to the middle of the next notch. The depth given is only approximate and is the depth of the deepest notch; it is rare that the notches are of the same depth: the deepest are usually the middle ones—those at the ends of the series are generally notably shallow, though not always.

It is proper here to indicate the location of other specimens so far as I know them. Besides those already mentioned in the Museum at Toluca there are eight specimens in the National Museum in the City of Mexico. These specimens I have examined. Most of them are far more decomposed than the specimens already described, but are plainly the same thing. In the catalogue of the Anthropological Collections published by the Museum we read: "*Worked bones of Tlatelolco and Xico:* such were marked to record the hunt. Of the Chichemecs they say, 'that they were the greatest murderers and robbers in the world. They are so proud of this inhumanity, that for a blason they carry with them on a bone the count of those whom they have killed, and some of them contain twenty-eight, thirty, or even more.' (Dic. Univ. de Hist. y Geog. Apen., vol. ix., p. 69). We have met with an example in Anacuco, Chalco, like those of Tlatelolco, with twenty-eight notches.'" (Translated.)

Not only were human bones so notched, but animal bones as well. Señor Chavero, according to Orozco y Berra (see quotation below) had a rib of a fossil elephant, which had been so treated.

I cannot claim to have diligently examined the literature for mention of such notched bones. Since securing my first specimens I have,

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14 FEMORA.

	Marks occupy	Number originally	Number remaining	Regularity	Average separation	Least and greatest sep.	Depth	Use apparent	Site of Marks	Remarks.
1. (left)	middle third	8	8	Yes	11.4	11–12	4	Much	Anterior surface	
2. (left)	second fifth	5	5	Yes	10.2	8–12	3.5	None or little	Anterior surface	Sharp cut.
3. (left)	middle fifth	6	6	Yes	9	8–10	1.5	Little	Anterior surface	Unusually wide and shallow notches.
4. (left)	middle fourth	8	8	Yes	8	6–9	3	Yes	Anterior surface	Notches wide and deep.
5. (left)	mid. two-th'ds	9	9	Yes	17.5	17–18	3.5	Yes	Anterior surface	
6. (left)	middle third	10	10	Yes	9.6	8–11	4	Some	Anterior surface	
7. (left)	mid. two-fifths	8	8	Yes	14.5	14–16	4	Yes	Anterior surface	
8. (right)	mid. two-fifths	9	9	Yes	11.5	11–13	5	Yes	Anterior surface	Deep, square cut.
9. (right)	6th-7th tenths	7	7	Yes	9.5	9–11	2.5	Yes	Anterior surface	Bone much decomposed.
10. (right)	middle half	7	7	Yes	15.3	14–16	3	No	Anterior surface	Strongly marked.
11. (right)	middle half	8	8	Yes	12.4	11–14	2	None or little	Anterior surface	Sharp.
12. ?	third-fourth	—	7	Yes	10	8–12	3	Yes	Anterior surface	Deep and clean cut.
13. ?	middle half	8	8	Mod.	13.5	12–14	2	Yes	Anterior surface	Bad condition.
14. ?	middle third	9	9	Mod.	6.6	5–9	1	Yes	Anterior surface	Bad condition.

2 HUMERI.

1. (left)	middle third	6.6	12	Irreg.	10.6	5–13	1.5	Yes	Two edges.	Notched on two edges; one set *notably* used.
2. (left)		8	8	Yes	10	9–12	1.5-2	Yes		Bone slender; both ends gone,

5 TIBIAE.

1. (left)	middle third	5	5	Yes	19	18–20	2	Little or none	Interior surface	Notches far apart; cut clear across.*
2. (right)	lower half	8	8		13.4	12–15		Little or none	Interior surface	Sharp and clean cut.†
3. (left)	middle third	10	10	Yes	8.2	7–10	2	Much	Internal border	Somewhat decomposed.
4. (left)	third fourth	8	8		10.7	9–14	2	Yes	Internal border	Platycnemic.
5. (left)	second fourth	8	8	Yes	7.2	6–9	2	Much	In'r sur. & in'l bor	Only one so cut.

* An unusually wide surface. † Bone very platycnemic.

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however, noted such references as I have met in my reading. They abundantly suffice to determine the purpose and the Aztec name of these bones. While Biart,[1] Brinton,[2] Orozco y Berra,[3] Sahagun,[4] Tezozomoc,[5] and others refer to them, two quotations will suffice to show (1) what these notched bones were called and how they were used, and (2) that they were sometimes buried with the dead.

In a foot-note to the description of the funeral ceremonies of the ruler Axayacatl given by Tezozomoc, Orozco y Berra says: "The *omichicahuaz* was not properly a rattle: this musical instrument, if it can be so called, consisted of a bone of a deer, sometimes of a man, with deep incisions perpendicular to its length, from which resulted parts successively depressed and elevated: this notched surface was rubbed either with another bone or with a shell, producing a sound not particularly agreeable. We have examined in the collection of our friend Alfredo Chavero, a fossil elephant rib, converted into this instrument, very similar to one used by African negroes." (Translation.)

This word *omichicahuaz* is variously spelled. Thus it occurs as *omichicahuaz, umichicahuaz, humichicahuaz, omichicaoatzli*. Dr. Brinton states the etymology os *omitl*—bone, *chicahuac*—strong.

The second passage for our purpose is from Orozco y Berra's *Historia*. (l. c.) The author there presents an account of Axayacatl's funeral ceremonies apparently abridged from Tezozomoc. From it we translate:

" . . The body was covered with four garments one over the other. The first of Huitzilopochtli.....; the second of the god Tlaloc.....; the third garment of the god Yohualahua, for the head the feather *tlauhquechotzontli*, in the hand a deer's bone notched such as is employed in certain dances for making noise, called *humichicahuaz*, and in the other hand a staff with timbrels; the fourth garment was that of the god Quetzalcoatl....."

We certainly have in these passages adequate description of such notched bones as we are studying. They are asserted to be musical instruments and it is stated that they were at times buried with the

1. Biart: *The Aztecs*, p. 305.
2. Brinton: *Ancient Nahuatl Poetry*, p. 24.
3. Orozco y Berra: *Hist. Ant. y de la Conquista de Mex.*, vol. iii.,, p. 360.
4. Sahagun: *Hist. gen. de las Cosas de Nueva España*, lib. viii., cap. 20, p. 308.
5. Tezozomoc: *Cronica Mexicana*, cap. 55.

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dead. In the light of this knowledge the bones may be reëxamined. Many if not most of them show plain signs of wear produced by something rubbed across the notched space. This wear is easily recognized after attention is directed to it. In the Lumholtz collection there is but one perfect humerus. Such a humerus is pictured in Plate vi. of Hrdlička's paper. Dr. Hrdlička says of it, (p. 72) "No rubbing over the markings apparent on the bone." Yet in the photo-reproduction given rubbing is *plainly* shown. Not all, but most, of the specimens from the State of Mexico show this wear distinctly, and it is of just such character as would be produced by the scraping of a bone back and forth. Moreover it is possible to tell in which direction the stronger *down* rub was made, as contrasted with the lighter return.

In Mr. Lumholtz's specimens there is a hole in one end of the bones (especially the femora) apparently for the purpose of removing the marrow. Mr. Lumholtz lays considerable stress upon this point. If the bones were to be used for rubbing time for dancers, would not dryness be desirable and would not this be more quickly gained by removal of the marrow? While this appears to us reasonable, it should be mentioned that the series here studied does not have such holes in them.

Two devices for rubbing time somewhat similar to the *omichicahuaz* are known to as in use among modern Indian tribes in the United States. Tonkaway women in certain dances use notched sticks across which bones are rubbed to give time. One end of the stick is rested against the ground, or better upon the bottom of a pan or other vessel; the other end is held up by the left hand; the bone, taken in the right hand, is rubbed strongly down and more lightly back. The result is much more musical and much less disagreeable than might be expected; the rhythm is excellent and the aid to song and dance considerable. I secured several of these sticks among the Tonkaways in 1893 and one of them is represented in our plate, side by side with some notched bones for comparison. Particular attention should be paid to the wear resulting from the rubbing in both cases. Very similar rubbing sticks—and some presenting points of difference—are used among some of our Pueblo Indians. An excellent specimen from Wolpi, the notched stick and the scapula used for scraping across it, is illustrated in James Stevenson's Catalogue. These notched sticks of the Tonkaways and Pueblos are the exact representative, still in use among living tribes, of the ancient notched bone—the *omichihuaz*—of the old Mexicans.

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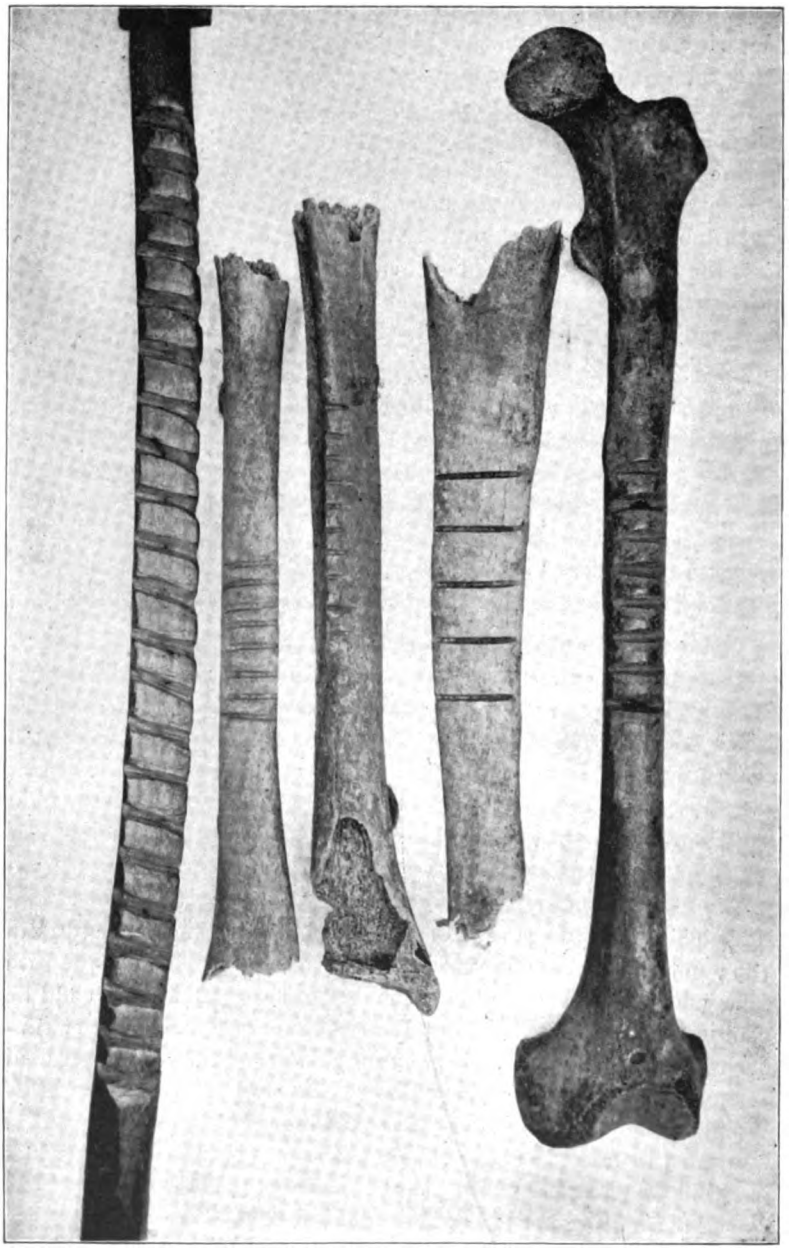

1 2 3 4 5

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DESCRIPTION OF PLATE.

1.—Notched stick –Tonkaway.
2.—Tibia: No. 5 in table.
3.—Tibia: No. 3 in table.
4.—Tibia: No. 1 in table.
5.—Femur: No. 4 in table, showing rubbing.

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A SHELL INSCRIPTION FROM TULA, MEXICO.

BY FREDERICK STARR.

PERHAPS the most interesting piece of carved shell so far found in Mexico is the specimen now to be described. It was found at Tula, a town lying fifty miles north of the City of Mexico, famous as one of the localities explored by Charnay and one of the traditional sites of the Toltecs. The specimen at one time belonged to Dr. Antonio Peñafiel and will be figured and discussed by him in his great work on *San Juan de Teotihuacan*. As this work, from its great cost, will have but a small circulation, it seems desirable to place the specimen within reach of a larger number of students than are likely to be its readers.

The specimen consists of a rather irregularly shaped fragment of *haliotis* shell. It has suffered from time's effect and shows a dangerous tendency to splinter and scale. The material is nacreous and still retains much of its lustre and some of its play of color particularly on the outer, convex, surface. The fragment has been trimmed and ground to an imperfectly rectangular form; one corner is quite sharply right angled and the two edges there meeting plainly show the operation of grinding. On the inner, concave, surface are three drilled holes. Two of these, near the right hand border, are carried completely through the specimen and were apparently intended for the passage of a cord for suspension. These holes were drilled with a solid drill and from both sides; the lower one is smooth bore and of nearly uniform diameter; the upper more plainly shows the drilling as done from both sides and is smaller at the middle where the two drillings meet. The diameter of these holes is about 4mm. The third hole is situated near the upper left hand corner but was never bored entirely through the shell. On the outer, convex, surface we also find three holes: two are those already described as piercing the piece and are near the left hand border; the other, never finished though carried almost through, is near the right hand border, not far from the bottom. The specimen measures 93mm. in height, 57mm. in greatest breadth and not more than 8mm. in thickness.

The whole inner, concave, surface is occupied by an elaborate carving representing a seated figure. The legs are crossed, the feet bare;

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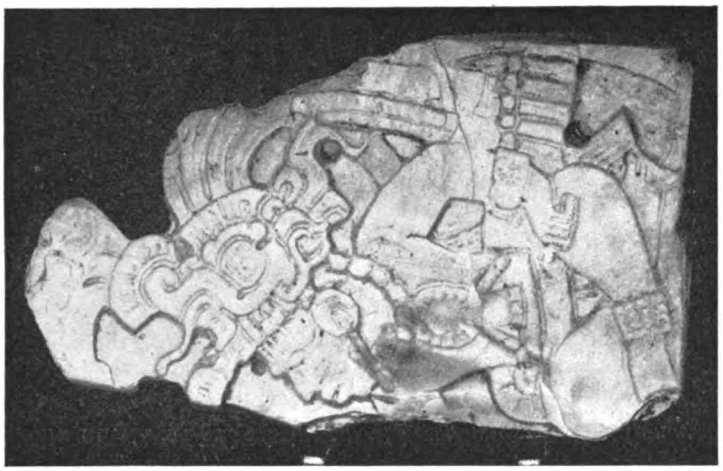
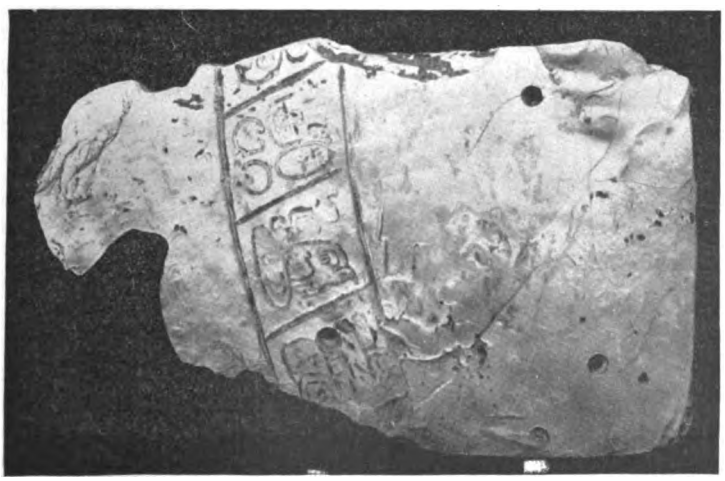


ornamental bands surround the ankles. A band passes around the waist and from it there appears to hang some sort of an apron or other ornament. The left arm is akimbo and the hand, with fingers bent at the knuckles rests upon the knee; a cuff or ornamental band surrounds the wrist. Of the right arm only the shoulder and extreme upper part are visible, the rest being broken off. About the neck is a necklace of almost circular large beads, eight of which are plainly shown. From it there hangs over the breast a plate or ornament, apparently of jade (as the piece much resembles the conventional Aztec sign for



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chalchihuitl or greenstone); it consists of a plain elliptical or nearly elliptical central face surrounded by a beaded border. From it in turn hangs a pendant consisting of a broader central band and two narrower divergent pieces. The ear contains an ear-disk with pendant. The face, shown in profile, is notable for its prognathism, the strong somewhat aquiline nose, and the retreating, perhaps artificially deformed forehead. The forehead is crossed by a plaited band, above which rises an elaborate helmet head-dress with crest of long pendant plumes. The carving is handsome and boldly done. The workmanship is more Mayan than Aztecan or Zapotecan.

This Mayan character of the art is in keeping with the inscription on the reverse of the specimen, which is the feature most deserving of careful study. This is located in the lower part of the upper third of the piece. The characters composing it are four in number and are contained in rectangular spaces formed by straight deeply-cut lines; these form a continuous band across the specimen. Two of these spaces are entire; the other two are partially destroyed. The characters contained within them are clearly related to the "calculiform" characters of Mayan inscriptions on monoliths, pottery vessels and carved greenstones and to those of the codices. The figure given in the plate gives a perfect idea of the characters, their arrangement and their position. For purposes of comparison, however, they are represented here in a special cut. This has been made by taking a tracing over the photograph and then perfecting it.

Should these characters prove, as I believe, to be Mayan we are naturally, though not *necessarily*, led to one of two startling conclusions:

(a) That the calculiform characters were already developed and were in use at Tula, far outside of the recognized Mayan region, before the abandonment of that city—or (b) that relations of trade and barter connected Tula, at the time of its occupancy, with some Mayan region—presumably to the East, South, or Southeast.

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THE GENUS PEDIOPSIS.

(A Review of the North American Species.)

BY HERBERT OSBORN AND ELMER D. BALL.

This genus is one of the most difficult of the *Jassoidea* in which to define species, for although with fresh specimens there is little difficulty in separation, and in most cases the host plant of itself will decide as between the species most likely to be confused, still, as a group, the species are remarkably alike in structural characters, the variations being usually those of degree rather than of kind. The genitalia, the ordinary recourse when other characters fail, are utterly valueless, the variation for the whole group being scarcely more than the ordinary variability in a species.

The few structural characters available, together with the color have, however, been found sufficient to readily and accurately separate those species under observation in a series of life-history studies in the group,* and as the result of the determination of the range of variation in these species, it has been found much easier to refer some of the more widely variable examples of other species to their proper places.

The greatest difficulty in working over material in this group arises from the fact that the green color in most of the green species "fades" or changes to a dirty yellowish when immersed in alcohol or on exposure to a strong light, thus altering very much the appearance of the specimen.

The black marking on the propleura has been found to be fairly constant in most of the species in which it exists, and is the readiest means of separating some species; but as it is often only a sexual character and sometimes fails when it is needed the most, as in some of the lighter colored females of *ferruginoides*, it has been thought best to depend on other characters for the synopsis and thus leave it as a sort of check, except in the case of *occidentalis* where, with our imperfect knowledge of the species, it appears to be the best character available for the purpose.

* Dav. Acad. Sci., Vol. VII., 1897, and Ia. Exp. Sta. Rept., 1897.

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The material upon which this paper is based consists of the types of the Van Duzee species together with the entire collection upon which his review of the genus was founded; the types of the Osborn and Ball species with an extensive series of the Iowa forms, the result of the life history work; typical specimens of the two Gillette and Baker species, as well as a series of the Colorado forms through the kindness of Prof. Gillette, together with numerous smaller series from different parts of the country, mentioned under the species. Van Duzee has so thoroughly characterized the genus * that there is little to add in that respect.

In the determination of the species he was less fortunate, as on examination of a large series the specimens determined as Fitch's *trimaculata* proved to be only an obscurely marked form of *bifasciata*, often found in specimens collected late in the season, and as a result of this error the real *trimaculata* was described as *insignis*. Still, too much credit cannot be given for the careful and painstaking manner in which he brought out specific characters, hampered as he was by the insufficiency of the material at hand. Of two of his species, *punctifrons* and *occidentalis*, no new material is at hand so that nothing further in regard to their variation can be given, and of *canadensis* only two additional females, both too much altered in color to aid in characterizing that species, have been seen.

Of most of the rest of the species an abundance of material has been at hand showing the ordinary variation of the species and the normal differences in the sexes.

Although doubtless somewhat artificial, the grouping in the synopsis is an attempt to show some of the more prominent variations in the generic type and their probable relationship. In the first group are placed species like *tristis*, with stout bodies, strong elytra, and deep colors.

The second group includes all the species with transversely banded elytra and is closely connected to the third by *bifasciata*, in which the second band is often obsolete.

The species of the fourth or *viridis* group all have males much smaller and darker than the females.

The *punctifrons* group is probably the most distinct and easily recognizable of all; here the males as seen from above scarcely differ in size

* Review of the North American Species of Pediopsis, Ent. Amer., Vol. V., pp. 165-174, Sept., 1889.

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or color from the females, but the face is usually more strongly marked. It would seem as if this group came nearer the European *virescens* than either *viridis* or *occidentalis*, the former species possessing both a spot on the face and the green color in the males.

The members of this genus are widely distributed throughout the North Temperate Zone, Europe possessing a larger number of species than are at present known in America, none, however, being common to the two countries though a number are closely related.

They are almost exclusively tree feeding forms; the twelve North American species of which the food plants are known are all tree feeders, and most of the European species are so credited.

In both countries the greatest number of species, and those the most abundant and widely distributed, occur on the different species of willows; besides these in this country the cottonwoods, the wild plums and the honey locust each have two species, while of three species, *canadensis*, *occidentalis*, and *punctifrons*, nothing is known as to food plants. The two latter are closely related to willow feeding forms in both countries, and it may be conjectured that they will also be found to occur on willows.

The larvæ are all short, stout-bodied forms; the head is short and straight, appearing from above as a narrow band in front of the broad, straight-margined pronotum, which is slightly emarginate at the anterior corners to receive the eyes; the abdomen is broad and short, rounded on the lateral margins and dorsally carinate. In color they usually mimic some part of the tree on which they feed and are detected with difficulty when at rest.

The larvæ and adults are often very nearly alike in color, but the characteristic anterior angle of the adult is entirely wanting in the larvæ, those with acutely angled heads, having in the larvæ as short, straight heads as their blunter headed relatives. The only noticeable difference is a slightly increased width between the eyes, the anterior angling of the pronotum and the consequent production of the head taking place entirely during the change to the adult. In this respect they agree with the *Bythoscopus* larvæ, and both forms show a much closer relationship to *Idiocerus* through their larvæ than would appear from the adult structure. On the other hand *Agallia*, though closely resembling *Idiocerus* in adult characters, seems to depart most widely from it in the larval stage.

All the species in which the life history is known are single-brooded. The larvae appear during early summer and usually mature by the last

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of June. The adults occur from the middle of June until the middle of August, varying with the different species. In general the adult stage of a given species lasts scarcely six weeks, while for the individual it is less than a month. The males usually appear a full week before the females and disappear as much earlier.

ARTIFICIAL KEY TO THE SPECIES.

A. General color above fuscous or rusty brown, scarcely a trace of orange or green.
  B. Face greenish, a fuscous band above and a large spot below the ocelli.....*tristis* V. D.
  BB. Face unicolorous.
    C. Elytra broadly rounding at apex, dull brown with two or three round pale spots, female segment short.....*trimaculata* Fitch.
    CC. Elytra longer and slightly pointed behind, rusty brown, darker in the male, without distinct spots, female segment longer than width at apex.....*sordida* V. D,
AA. General color orange or green, often maculate with ferruginous or fuscous.
  B. Face unicolorous, species of medium or large size.
    C. Elytra with more or less of orange, or maculate.
      D Elytra with a transverse hyaline band before the apex of clavus.
        E. Vertex and face yellowish or ferruginous.
          F. Elytra with a single hyaline band; vertex right angled.....*ferruginoides* V. D.
          FF. Elytra with two transverse bands; vertex obtuse.....*canadensis* V. D.
        EE. Vertex and face olive brown, elytra hyaline, brownish with a broad fuscous band at the base and a narrower one before the apex.....*bifasciata* V. D.
      DD. Elytra without distinct transverse hyaline bands, costal margin lighter.
        E. Pronotum greenish.
          F. Pronotum with a black stripe just within the lateral margin, entire clavus and a narrow stripe on around to apex of corium black.....*suturalis* O. & B.
          FF. Pronotum unicolorous green, clavus dark brown at base, apex and all of the corium except the costal margin hyaline brownish.....*basalis* V. D.

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E. Pronotum saffron yellow, elytra brownish on the disc.....*crocea* O. & B.

CC. Elytra hyaline greenish in the female, slightly brownish or fuscous in the male.

D. Pronotum right angled before, varying from orange to green in female, olive brown with two impressed black dots behind each eye in male....*erythrocephala* G. & B.

DD. Pronotum obtusely angled.

E. Propleura with a black spot in both sexes.....*occidentalis* V. D.

EE. Female with the propleura unmarked.

F. Female from 5-6 mm. in length, males with a spot on propleura.....*viridis* Fh.

FF. Females less than 5 mm. in length, males with propleura unmarked.....*gleditschiæ* O. & B.

BB. Face spotted (spots sometimes obscure or wanting), species small, less than 4.5 mm. in length.

C. Five spots on the face in the male, species with dark markings on pronotum and scutellum, elytra with fuscous nervures.....*punctifrons* V. D.

CC. Two black bands, sometimes reduced to three spots, on face of male, species bright light green above without dark markings, elytral nervures indistinct....*reversalis* O. & B.

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PEDIOPSIS TRISTIS V. D. (Plate II., Fig. 3.)

Pediopsis tristis V. D., Can. Ent., XXII., p. 249, 1890; Osborn, Proc. Ia. Acad. Sci., I., pt. 2, p. 126, 1892; Van Duzee, Cat., p. 260; Osborn & Ball, Davenport Acad. Sci., VII., p. 66, 1898.

Grayish brown above; yellowish green below; face with a black band above and a large black spot below. Length, ♀ 5.5 mm.; ♂, 4.75 mm.; width, 2 mm.

Pronotum, anterior margin a right angle, rugae strong, not curved, disc brown, an elongate impressed mark on the anterior margin just within either eye and a small spot outside of this black, most of the rugae and a semicircle on either side enclosing the black markings yellowish green. Scutellum yellowish green, a black triangle within either basal angle, disc brown in the male, elytra light brown, nervures light, heavily fuscous-margined, rendering them very distinct. Face yellowish green, a broad band extending nearly across the superior margin, running down as a point in the middle and emphasized as distinct spots above the ocelli, and a nearly circular spot

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occupying the entire disc of the front, dark brown or black. Propleura unmarked or with a pale spot in some males, the triangular piece below marked in both sexes. Legs brownish, tibiae lined with fuscous.

Habitat, Ames and Fairfax, Iowa. Occurs on wild plum. Readily distinguished by the spots on the face and the distinct nervures.

PEDIOPSIS TRIMACULATA Fitch.

Pediopsis trimaculata Fitch. Homopt. N. Y., St. Cab., p. 60, 1851.

Bythoscopus trimaculata Walk. Homop. B. M., IV., 1162, 1852.

Pediopsis insignis V. D. Review, Ent. Am., V., 171, 1889; Can. Ent., XXII, p. 249, 1890; Cat., p. 260; Harrington, Ottawa Nat., VI., p. 31, 1892; Osborn, Proc. Ia. Acad. Sci., I., pt. II., p. 126, 1892.

Dull yellowish brown, sometimes blackish brown in the male, with three white spots in a row on each elytron, the anterior one sometimes obsolete Length, ♀ 4.25; ♂, 4 mm; width, 1.50 mm.

Pronotum obtusely angled before, rugae fine but distinct, disc brownish, margins and rugæ washed with yellowish green, scutellum brown, coarsely maculate with olive, a dark spot within either basal angle. Elytra dull brown in the female, dark brown in the male, nervures pale, a pale spot at the apex within the third and fourth apical cells, a longer one including the junction of the anteapical and basal cells and a third and much smaller one midway from the base, the latter sometimes obsolete.

Face and all below yellowish or yellowish green in the female, brown in the male, propleura marked in both sexes, obscured by the brown color in the male.

Habitat, Canada, New York, Michigan, Iowa, and Kansas.

This is undoubtedly the species that Dr. Fitch had in hand, the lighter colored females answering perfectly his short description. It occurs on the wild plum with the preceding from which it may be separated either as larva or adult by the absence of the black on the face. Fresh specimens have a powdery appearance resembling the bloom on the young stems of the plum.

PEDIOPSIS SORDIDA V. D.

Pediopsis sordida, V. D. Can. Ent., XXVI, p. 89, 1894; Cat. p. 260; Gillette & Baker, Hemip. Colo., p. 73, 1895.

Rusty brown, very variable in depth. Elytra with rusty brown

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patches on a milky sub-hyaline ground in female, deep reddish brown in male. Length, ♀ 4.75–5 mm; ♂, 4.50mm.; width, 1.50 mm.

Pronotum obtusely angled before, rugae coarse, rather broken and somewhat curved around the polished area just inside either eye, these areas and sometimes the margins yellowish, disc rusty brown, scutellum very variably marked, often entirely brownish. Elytra longer in the female than in *trimaculata*, milky sub-hyaline, irregularly washed with rusty brown, deepest on the base; in the male of a deep nearly uniform reddish brown, face yellowish green sometimes washed with brownish, a spot on the propleura in the male often obscured by the brown color below.

This species has only been received from Colorado. It varies much in depth of color, sometimes even approaching *trimaculata* from which it may be readily distinguished by the longer and more pointed elytra and the absence of the light spots.

PEDIOPSIS FERRUGINOIDES V. D. (Plate II., Fig. 4.)

Pediopsis ferruginoides V. D., Review, Ent. Am., V., 181, 1889; Cat., p 260; Osborn & Ball, Dav. Acad. Nat. Sci., VII, p. 66, 1898.

Pediopsis bifasciata Gillette & Baker. Hemip. Colo., p. 72, 1895.

Light or dark ferruginous, a transverse hyaline band on the elytra including the cross nervures at the bases of the anteapical cells. Length, ♀ 5.50–6 mm.; ♂, 5 mm.; width, 1.80 mm.

Pronotum nearly right-angled before, rugae coarse but rather shallow and inconspicuous, elytra rather long and narrow, apex acutely rounding. Color: face, pronotum and scutellum usually light ferruginous. Elytra usually a dark reddish brown, with the hyaline band in strong contrast. In some of the females the elytra are scarcely darker than the pronotum while in others and in most of the males the pronotum, excepting a light spot behind the eyes and the upper part of the face, are nearly as dark as the elytra, all below some shade of yellow, propleura usually with a large spot in both sexes.

Habitat, Montana, Colorado, Nebraska and Iowa. Occurs on the narrow-leaved willows, adults from the middle of June until the middle of July. The specimens from which the species was originally described were both of the lighter-colored females. The majority of the females, however, are much darker, as are all the males. The Colorado specimens reported as *bifasciata* were faded examples of this species.

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PEDIOPSIS CANADENSIS V. D.

Pediopsis florescens V. D. Review, Ent. Am, p. 173, 1889.
Pediopsis canadensis V. D. Can. Ent., XXII., p. 111, 1890.

Greenish or reddish yellow, elytra brownish with two light bands, one near the base, the other across the apex of clavus. Length, 4.75 mm.; width, 1.5 mm.

Pronotum obtusely angled, elytra broad, rounding at apex; color, greenish or reddish yellow on face, pronotum and scutellum. Elytra brownish with a narrow light band just back of the apex of scutellum, and a broader one across the apex of clavus.

Below, fulvous, propleura unmarked.

The types and two other specimens from New York show considerable variation in the depth of the brown color between the base and the first light band, and suggest that this may possibly be an extreme form of *bifasciata*, but the breadth of the elytra and the absence of black markings on the scutellum and propleura would seem to be sufficient to separate it.

Habitat, Canada and New York.

PEDIOPSIS BIFASCIATA V. D.

Pediopsis bifasciata V. D. Review, Ent. Am., V., p. 173, 1889; Cat. p. 260.
Pediopsis trimaculata V. D. Review, Ent. Am., V., p. 172, 1889; Cat. p. 260; Harrington, Ottawa Nat., VI., p. 31, 1892.

Distinctly greenish or greenish brown with heavy fuscous or black markings in the basal angles of the scutellum, the basal half of the elytra, and again at the apex; males brownish with the elytra scarcely marked Length, ♀ 5.25 mm.; ♂, 4.50 mm.; width, 1.50 mm.

Vertex obtusely angled, thicker and more rounding than in *ferruginoides*. Pronotum greenish, washed with brown on the disc, often two fuscous marks on the anterior margins, rugae shallow, irregular, scutellum greenish, two spots just inside the basal angles fuscous, and two smaller round ones on the disc brown. Elytra: in the female whitish sub-hyaline, the costal margin greenish, a very variable amount of fuscous or black on the basal half, sometimes confined to the corium, often clear across, and again at the apex where it is usually in the form of a triangle, the apex in the anteapical cells; in the male the elytra are often brownish sub-hyaline and the fuscous markings

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obscure, below greenish, the face and ovipositor washed with yellowish, propleura usually marked in both sexes, male pygofers with a distinct black spot on the sides.

Habitat, Canada, New York and Iowa. Occurs abundantly on the cottonwood, to which its color is well adapted, the males hiding in the cracks in the bark, while the females, being more distinctly green, conceal themselves at the base of the petioles.

Only possessing the two specimens of this species, one taken early and the other late, it is no wonder that the variation in color induced Van Duzee to consider them distinct, but a comparison of the types with a large series collected throughout the season show them to be ordinary variations of the same species.

They may be readily separated from *ferruginoides* by the shorter vertex and the distinct greenish cast.

PEDIOPSIS SUTURALIS O. & B.

Osborn & Ball, Dav. Acad. Nat. Sci., Vol. VII., p. 67, 1898.

Vertex right-angled, narrow; color, green with a stripe on either side of the pronotum and the entire clavus black. Length, ♀ 6 mm.; width 1.75 mm.; male smaller.

Pronotum sharply angled before, the rugae shallow, a black stripe arising just behind either eye, widening to the humeral margin, including the entire clavus, and extending as a narrow stripe around to the apex of the elytra, remainder of the body and elytra green, oviduct, pygofers, except at the apex, and parts of the face, washed with yellow.

Habitat, New York (V. D. Coll.), and Iowa. Occurs on willows. The black stripes which appear in even the smaller larvæ render this a strikingly distinct species. A heavily marked form of *basalis* might be mistaken for this species were it not for its much shorter and broader head.

PEDIOPSIS BASALIS V. D.

Pediopsis basalis V. D. Review, Ent. Am., V., p. 171, 1889; Cat., p. 260; Prov. Pet., Faune, Ent. Can., III., p. 295, 1890.

- *Pediopsis fumipennis* G. & B. Hemip. Colorado, p. 73.

Female larger, head broad and blunt, green, the elytra sub-hyaline, washed with reddish brown, deepening into a fuscous band along the scutellar margin. Length, ♀ 5.5 mm.; width, 1.8 mm.

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Pronotum only a little longer in the middle than across the humera angle, rugae obscure. Pronotum, scutellum, costal margin of elytra, face and below, green, rest of the elytra and the basal angles of scutellum washed with brown, which is deepened on the base of the clavus into a more or less definite brownish fuscous band margining the scutellum ; pygofers yellowish, green at tip ; propleura unmarked.

Habitat, Canada, Iowa, Colorado. Occurs on cottonwood at Ames. This is a very distinct species on account of its broad, short vertex and large size. The male is not known. The difference in color seems to be due to localizations of the pigment; as the band becomes darker the brown disappears from the central part of the elytra.

Pediopsis crocea O. & B.

Pediopsis crocea O. & B. Dav. Acad. Nat. Sci., Vol. VII., p. 68, (Jan. 1898).

Bright saffron yellow, elytra clouded with brown, deepest on the clavus. Length, ♀ 5 mm.; width, 1.50 mm.; males smaller.

Pronotum obtusely angled before, much elevated behind, rugae coarse and distinct either side a median raised line. Face and pronotum bright saffron yellow; scutellum light yellow, the angles sometimes clouded with brown; elytra deep brown on the disc, fading to a broad yellowish costal margin, a saffron yellow line along the scutellar and humeral margins. Below light yellow, propleura unmarked.

Habitat, Lexington, Kentucky, on honey locust (Garman). This is quite distinct in all the specimens examined, the saffron yellow color remaining very constant and at once separating it from related forms.

Pediopsis erythrocephala G. & B.

Pediopsis erythrocephala G. & B. Hemip. Colorado, p. 72.

Large, stout, vertex pointed, green varying to reddish orange on face and pronotum in female, brownish or slightly fuscous in male. Length, ♀ 5.75 mm.; ♂, 5 mm.; width, 1.8 mm.

Vertex triangular, pronotal rugae fine, obscure; color, green varying to orange on face, pronotum and scutellum in female; male greenish washed with brownish fuscous all over, usually a pair of fuscous spots behind each eye and another pair on base of scutellum just visible from under the pronotum; below yellowish or orange, propleura

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with a large black spot in both sexes. Easily separated from the other green species by the larger size and much more pointed vertex as well as by the large spot on the propleura.

PEDIOPSIS OCCIDENTALIS V. D.

Pediopsis occidentalis Van Duzee. Psyche, V., p. 238, 1889.

Smaller, vertex obtuse, dull greenish yellow in the female, distinctly brownish in the male. Length, ♀ 5 mm.; ♂, 4 mm.

Vertex slightly rounder than in *viridis*, pronotal rugae distinct crescentiform. Elytra broader, apical cells shorter, general color darker, especially in males, propleura with a black spot in both sexes, much larger than in the male *viridis*.

Habitat, California, Nevada.

Van Duzee's "two small brown males from Nevada," mentioned under *viridis*, evidently belong here, and as placed, leaves quite a difference in depth of color, which, with the shorter vertex and larger spots on the propleura, makes this quite distinct from either *viridis* or *virescens* in the material at hand.

PEDIOPSIS VIRIDIS Fitch.

Pediopsis viridis Fitch. Homop. New York State; Cab., p. 59, 1851; id. reprint in Lintner's 9th Rept., p. 399, 1893; Uhler, Bull. U. S. Geol. and Geog. Surv., III., p. 467, 1877; Van Duzee, Can. Ent., XXI., p. 9, 1889; Ent. Am., V., p. 170, 1889; Prov. Pet., Faune, Ent. Can., III, p. 294, 1890; Van Duzee, Psyche, V., pp. 238, 388, 1890 (mention); Harrington, Ottawa, Nat., VI., p. 31, 1892 (mention); Osborn, Proc., Iowa Acad. Sci., I., pt. 2, p. 126, 1892 (mention).

Vertex slightly obtusely angled; color, green, males slightly washed with fuscous, the elytra brownish towards the apex. Length, ♀ 5.25 mm.; ♂, 4.85 mm.; width, 1.40 mm.

Female green, the elytra sub-hyaline greenish, slightly brown at the apex, male deep green, slightly washed with fuscous, the elytra distinctly brownish except on base and costa. Propleura with a small spot in males only, rarely wanting.

Habitat, Canada, New York, Iowa, Maryland, Kansas, Colorado.

This is the most common species on willow in Iowa as well as in the Eastern States; from *erythrocephala* it may be readily separated by the absence of the black spots on the female propleura and the fuscous

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ones on the male pronotum, and from *reversalis*, the other one of the green, willow species, by the larger size and unmarked face.

Of the six anomalous examples mentioned by Van Duzee under the discussion of this species, the three green males were light-faced examples of *reversalis*, one female was a *suturalis*, and the two that "mimiced the males" were probably examples of *gleditschiæ*. These being disposed of, the species is found to be fairly constant in the greenish females and brownish elytra in the males.

Pediopsis gleditschiæ O & B.

Pediopsis gleditschiæ O. & B. Davenport Acad. Nat. Sci., VII., p. 62, (Jan., 1898).

Slightly shorter and stouter than *viridis*, green, the males with the elytra tinged with fuscous. Length, ♀ 4.75 mm.; ♂, 4–4.25 mm.; width, 1.20 mm.

Vertex angled about as in *viridis*, pronotum with distinct rugae, elytra stout, usually compressed behind; color, deep green; the females with the inner and apical margins of the elytra washed with brown, the males lightly washed with fuscous, deeper on the elytra, below green, the propleura unmarked in either sex.

Occurs on the honey locust in abundance at Ames, Iowa, the adults appearing before the middle of June. This species is much smaller and darker than *viridis*, the females being very similar to the males of that species in size and color, while the males are still smaller and darker, thus exhibiting the same general sexual variation as in the two preceding species.

The absence of the spot on the propleura will serve to separate them from all but the female *viridis*.

Pediopsis punctifrons V. D.

Pediopsis punctifrons V. D. Review, Ent. Am., V., p. 174, 1889; Cat., p. 260.

Light or yellowish green, elytral nervures distinct, black spots occurring on face, pronotum and scutellum. Length, ♀ 4 mm.; ♂, 3.50 mm.; width, 1.20 mm.

Face yellowish with five black points, one at the apex, another on each side directly above the ocelli, and a pair of comma-shaped ones

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on the upper angles of the front. Pronotum with an elongate spot behind either eye, black, scutellum with the basal angles, two spots on the disc and a median longitudinal line sometimes interrupted, black, propleura with a distinct black spot in both sexes.

Habitat, Arizona. No new material in this distinct little species has been obtained, indicating that it is a more distinctly southern or western form.

The females are lighter colored than the males and in the lighter ones the spots are reduced in size.

PEDIOPSIS REVERSALIS O. & B.

Dav. Acad. Nat. Sci., VII., p. 69 (January, 1898).

Small, compact, light green, male with two heavy black bands on face, sometimes reduced to three spots. Length, ♀ 4.50 mm.; ♂, 4 mm.; width, scarcely more than 1 mm.

Vertex slightly more roundingly obtuse than in *punctifrons*. Pronotum nearly smooth, rugae fine, obscure, the anterior pits obsolete; color, light green, the males with the elytra scarcely if at all darker than in the females; male face in the darker specimens with two broad black bands, one on the superior margin not quite reaching the eyes, and another between the antennal pits; in lighter specimens these bands may be reduced to three small spots, one at the apex and one on each superior angle of the front, propleura with a round black spot in the male.

Habitat, Iowa and New York. Occurs on the narrow-leaved willows.

Its small size and light green color, even in the males, will serve to distinguish it from all the other green species without reference to the marking on the face of the males.

NOTE.—*Pediopsis nubila* V. D., from California, seems to be more closely related to the genus *Bythoscopus* in head characters than to this genus, and has been purposely omitted from the synopsis. The reticulate venation renders it a very distinct form in either genus.

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A REVIEW OF THE NORTH AMERICAN SPECIES OF IDIOCERUS.

BY HERBERT OSBORN AND ELMER D. BALL.

The members of this genus are easily recognized by their large size, broad, short heads, the eyes exceeding the pronotum in width, which in turn exceed that of the narrow apices of the folded elytra, giving the insects a wedge-shaped appearance.

The vertex is short and parallel-margined, rounding in front to the face, ocelli on the face between the eyes, just above the origin of the frontal sutures The male antennæ usually bear a disc-like swelling near the tip; this is wanting, however, in a few of the European and a number of the American species. The elytra are usually longer than the abdomen and rather narrowly folded behind. There is but one transverse nervure between the sectors and that is often wanting in *crataegi*, four apical and three anteapical cells being the typical number. The elytra always possess a distinct appendix and the supernumerary cell is present in the wings.

Specific characters are found in the size and position of the spots on the vertex when present, in the size and shape of the outer anteapical cell, the shape of the facial pieces, the shape of the antennal discs of the male and the general size and color. The genitalia are of less classificatory value in this group than in most of the *Bythoscopidæ*, the male organs presenting few variations that are available for use, their place being somewhat supplied, however, by the antennal discs.

In the female the shape of the last ventral segment and the length of the ovipositor are important characters in some cases.

The genus is widely and generally distributed throughout the North Temperate Zone. Europe has over thirty recognized species, and it is probable that that number will be reached in America when the fauna is better known.

The species of which the life histories are known are all exclusively tree-inhabiting forms in both larval and adult stages and are very limited in their range of trees, being confined to the different species of

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Salix, *Populus* and *Cratægus*, the different species usually being confined to trees of a single genus and sometimes to a single species The larvæ usually mimic the color of some part of the tree upon which they feed and are difficult to detect; they may be readily separated from those of other tree-inhabiting forms by their broad heads, prominent eyes and long roundingly tapering abdomens.

As far as known all the species are two-brooded, the adults hibernating and depositing eggs in spring. In the case of *alternatus* the eggs are placed near the tip of the younger twigs, usually several in a place, often causing distortion or death to the part.

SYNOPSIS OF THE SPECIES.

A. Crest of the vertex with two round black spots about twice farther from each other than from eyes,

B. Spots on the vertex large, scarcely more than their own diameter from the eyes species in which the head is very deep and the pronotum arched (male antennæ without discs).

C. Outer branch of first sector of elytra again forked, usually forming a triangular anteapical cell before curving away to the costal margin, species fulvous with light marking.

D. Clavus fulvous, usually a light stripe just outside the outer nervure, center of costa with a large black area..... ..... *maculipennis* Fh

DD. Clavus with the basal half creamy yellow, except a black line along the scutellar margin, center of costa scarcely darkened..... *provancheri* V. D.

CC. Outer branch of first sector of elytra usually simple, sometimes an oblique nervure running to the costa. Species light gray with a pair of large, angular, black spots on each, pronotum and scutellum in line with those on the head..... ..... *cratægi* V. D.

BB. Spots on vertex small, two or more times their own diameter from the eyes.

C. Nervures of elytra not distinctly alternating in color, the outer fork of the outer branch of first sector usually curving away to the costa without forming an anteapical cell, or, at most, a small triangular one.

D. Species green, a dark line along the sutural margin of elytra, nervures indistinct (male antennæ without discs). ..... *snowi* G. & B.

DD. Species brown, the elytra milky sub-hyaline with distinct tuberculate brown nervures (male antennæ with discs).

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EE. Outer branch of first sector not forking again until some distance beyond its anastomosis with the inner branch, rarely forming a closed anteapical cell; face brownish fulvous without accessory markings.. ..... *brunneus* O. & B.

EE. The outer branch of first sector forking at or before its juncture with the inner branch, often forming an anteapical cell; face yellow with accessory black markings ..... *lachrymalis* Fh.

CC. Nervures of elytra usually alternately light and dark, the outer anteapical cell long and narrow.

D. The cross nervure between the first and second sectors broadly white — male antennæ without discs..... ..... *moniliferæ*, O. & B.

DD. The cross nervure of elytra not falling in a light band.

E. Species 5 mm. long or over, dark colored. The face with six longitudinal stripes below, especially noticeable in the male; male antennæ with moderate discs at the end of longer filaments .... *alternatus* Fitch.

EE. Species smaller, not over 4.5 mm., lighter colored, face pale greenish or yellowish without stripes below, male antennæ with very large discs on filaments scarcely the length of the discs .... *verticis* Say.

AA. Crest of the vertex without distinct round spots.

B. Male antennæ without discs, species uniformly tawny or becoming darker, with transverse band on elytra.

C. Species 5 mm. or under ..... *rufus* G. & B.

CC. Species larger, over 5 mm..... *mexicanus* n. sp.

BB. Male antennæ with distinct discs, species greenish or with darker markings on the sutures.

C. Species with distinct color markings on pronotum, scutellum or sutural margin of elytra.

D. A dark stripe along the sutural margin of elytra often interrupted by a light crescent (male antennal discs elongate)..... *suturalis* Fh.

DD. Pronotum and scutellum more or less marked with fulvous fading out along the suture (male antennal discs nearly circular) ..... *amoemus* V. D.

CC. Species nearly unicolorus, the scutellar angles rarely black.

D. Size large (the largest in the genus), more than 5 mm. long.

E. Elytra pale greenish, the outer fork of first sector forming a triangular anteapical cell before curving away to the costa, male antennal discs large .... *pallidus* Fitch.

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EE. Elytra iridescent, yellowish, the tip darker, especially in male, the outer fork of first sector curving away to the costa without forming an anteapical cell; male antennal discs very small. *duzei* Prov.

DD. Size smaller, less than 5 mm., yellowish or greenish, the elytra hyaline, showing the dark nervures of the wings. ..... *nervatus* V. D.

IDIOCERUS MACULIPENNIS Fitch. (Plate III., Fig. 4.)

Idiocerus maculipennis Fitch. Homop. N. Y. State Cab., p. 59, 1851.

Bythoscopus maculipennis Walk. Homop., IV., p. 1161, 1852.

Idiocerus maculipennis V. D. Psyche, V. p. 388; Osborn, Proc. Ia. Acad. Sci., I., pt. II., p. 126 (Iowa); Van Duzee, Trans. Am. Ent. Soc., XIX., p. 262.

Chestnut brown with narrow light stripes on pronotum, scutellum, and clavus. Length, ♀ 5.75 mm.; ♂, 5.25 mm; width, 1.7 mm.

Face, in the female, chestnut with broad circles around the large black spots on vertex, and small crescents under the ocelli light yellow; in the male, yellow with a chestnut stripe down the middle and a darker one each side from the corner of the eye down the genæ outside the loræ. Pronotum chestnut with a pair of black spots on the anterior margin, the posterior margin and three spots on the disc light yellow, scutellum with the margins and tip light yellow. Elytra brownish, the nervures darker, a narrow light stripe on the outer margin of clavus, and a hyaline band crossing the apex and broadening towards the costa where it sharply interrupts the broad dark margin.

Head scarcely wider than the short convex pronotum but very deep. The outer anteapical cell short, triangular, the nervure then curving away to the costa. Ultimate ventral segment of the female with the posterior margin rounding, slightly emarginate in the middle; male valve with the posterior margin acutely triangular, the sides concave.

Found abundantly on hawthorn and crab apple, to which the chestnut brown color of both adult and larvæ are well adapted. Specimens are at hand from New York, Ontaria, and Iowa.

IDIOCERUS PROVANCHERI V. D.

Bythoscopus clitellarius Prov. Pet. Faune Ent. Can., III., p. 288, 1890.

Idiocerus provancheri V. D. Can. Ent., XXII., p. 111, 1890; Osborn, Proc. Iowa Acad. Sci., I., pt. II., p. 126, 1892.

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Fulvous brown, resembling *maculipennis*, but with a broad yellow stripe on the clavus. Length, ♀ 5.3 mm.; ♂, 5 mm.; width, 1.7 mm.

Face as in *maculipennis* in both sexes, pronotum lacking the black spots and the light margin, the two outer spots smaller, the middle one elongate; scutellum entirely rufus, darker in the male. Elytra fulvous brown, the nervures indistinct, scutellar margin black; just outside this to the margin of the clavus and extending back to just before the apex of the outer claval nervure where it rounds off is a distinct bright yellow area; costal margin with a hyaline spot before the tip.

Structurally very close to *maculipennis*, slightly smaller, readily distinguished by the bright yellow clavus.

Occurs, with the preceding, on the different species of *Cratægus*. Specimens are at hand from Canada, New York, Iowa, Colorado, and Van Couvers Island, B. C. Mr. Van Duzee has furnished records* of its occurrence at Montreal, Winnipeg, and Hamilton (Jas. Johnson), Mt. Washington (Mrs. Slosson).

IDIOCERUS CRATÆGI V. D.

Idiocerus cratægi V. D. Can. Ent., XXII., p. 110, 1890; Osborn & Ball, Ia. Acad. Sci., IV., p. 231.

Olive drab with six black spots in two rows. Length, ♀ 5.25 mm.; ♂, 4.75 mm.; width, 1.8 mm.

Face, pronotum and scutellum light greenish yellow, a pair of triangular black spots on the anterior margin of each pronotum and scutellum in line with those on the vertex, a small approximate pair on the disc of the scutellum, a pair beneath the ocelli and a pair of elongate ones beneath the antennæ, elytra olive brown, the nervures dark. Head much broader than in the preceding species, eyes prominent, face deep but more strongly curved than in either. Elytra without an anteapical cell in the outer fork of the first sector and often without a transverse nervure between the sectors. Ultimate ventral segment of female nearly triangular, the apex slightly angularly emarginate. Ovipositor broad and short, male valve large, roundingly triangular, nearly half the length of the short, broad plates

Occurs on *Cratægus* appearing a little later in the season than the two preceding. Specimens are at hand from Canada, New York, Iowa and Colorado.

*Kindly supplied from his notes, along with other records, included under other species.

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IDIOCERUS SNOWI G. & B.

Hemiptera of Colorodo, p. 79, 1895.

Pale green, elytral suture and two spots on vertex dark. Length, 5 25–.75 mm.; width, 1.8 mm.

Face pale yellowish, two small round black spots on vertex, tip of clypeus bright green. Pronotum and scutellum unmarked. Elytra pale yellowish green, the apical nervures and margin slightly darker, a dark brown band along the sutural margin from the apex of scutellum to the apex of clavus. The costal nervure green. Legs and beneath yellowish, tarsi green.

Face short, rounding below; male antennæ not inflated; outer nervure of elytra forking at or before its juncture with the second, the outer branch forming a triangular anteapical cell, before curving away to the costa. Ultimate ventral segment of female moderately long, posterior margin with the corners rounded and the center emarginate; pygofers long, much exceeded by the attenuate ovipositor.

The dark marking on the suture is somewhat variable; when heavy this species resembles *suturalis*; when very pale, *pallidus;* but it is readily separated from either by the spot on the vertex, the simple antennæ in the male and the emarginate female segment.

Occurs on willows, apparently preferring the narrow-leaved varieties. Specimens are at hand from Iowa, Colorado and Ohio.

IDIOCERUS BRUNNEUS O. & B. (Plate III., Fig. 3.)

Proc. Davenport Acad. Nat. Sci., Vol. VII., p. 72. (Jan., 1898.)

Dull cinnamon brown, two black spots on the vertex. Broad with a depressed face. Length, 5.5 mm; width, 2 mm.

Face tawny; a yellowish circle around the black spots and an interrupted line below; ocelli black; pronotum and scutellum cinnamon brown with lighter markings in the female, darker with black spots on scutellum in male. Elytra brownish sub hyaline with distinctly tuberculate dark brown nervures. Head broad, face much depressed, the front broad and convex, outer fork of first sector forking again some distance beyond the cross nervure, the outer branch curving away to the costa, rarely forming an anteapical cell.

Ultimate ventral segment in female very short, slightly produced and obsoletely notched in the middle; pygofers short, broad, only

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slightly exceeded by the ovipositor; male valve roundingly pointed, plates broad and short; antennæ with small, slightly elongate discs.

Occurs on willows. Specimens are at hand from Iowa, Nebraska and Colorado. The short, broad form and cinnamon color will readily separate this species from any other.

IDIOCERUS LACHRYMALIS Fitch.

Idiocerus lachrymalis Fitch. Homop. N. Y. State Cab., p. 58, 1851; id. reprint in Lintner's 9th Rept., p. 398, 1893; Van Duzee, Can. Ent., XXI., p. 8, 1889; Psyche, V., p. 388, 1890; G. & B., Hemip. Colo., p. 76, 1895.

Bythoscopus lachrymalis Walk. Homop., IV., p. 1161, 1851.

Large, pale, yellowish, washed with brown, a large spot against either eye and a line between the two spots on the vertex, dark brown. Length, ♀ 7 mm.; ♂, 5.5 mm.; width, ♀ 2 mm.; ♂, 1.5 mm.

Face yellow, usually a large triangular spot against either eye, a smaller one on the front just within and below either ocellus and a band between the two spots on vertex, dark brown. Pronotum pale yellowish, milky posteriorly, more or less marked with darker. Elytra milky white, the nervures distinct, dark brown, outer anteapical cell very variable in size, often wanting. Ultimate ventral segment of the female strongly medially produced; male antennal discs large, twice longer than wide.

Mr. Van Duzee notes it from Franconia and Mt. Washington, N. H. (Mrs. Slosson), Mountains of Northwestern Colorado (Gillette.)

Specimens are at hand from Ontario, New York, and Colorado. This is a very variable species both in size and coloration and has been confused with several other species. When the spots on the face are present they will readily separate it from any other species; when wanting, as is often the case in the male, the short or wanting anteapical cell, the produced female segment, and the long nearly parallel-sided disc of the male antennæ will serve to readily separate it.

The *I. productus* of G. & B., on examination of a type, proved to be founded on nothing but a pair of crushed specimens of the above species, the "remarkable form of the head" being due to the vertex having been pushed forward and crushed along a middle line—probably when the specimens were very fresh, as the coloring matter had somewhat segregated into the crushed area, but not forming a distinctly bounded black spot as shown in the cut accompanying the description.

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IDIOCERUS MONILIFERÆ O. & B. (Plate III., Fig. 2.)

Idiocerus moniliferæ Osborn & Ball. Proc., Davenport Acad. Nat Sci., Vol. VII., p. 71 (Jan., 1898).

Idiocerus moniliferæ Osborn. Proc., Ia. Acad. Sci., Vol. V., p. 233.

Broader than *alternatus*, brownish with light markings, face with a broad dark band, cross nervure of elytra white. Length, 5 50 mm.; width, 2 mm.

Face yellowish, a broad transverse black band between the ocelli and the spots on the vertex, this band produced downward against the eyes and sending a slender line towards the antennal pits. Front very broad, rounding away from the antennæ, a brownish band either side just inside the margin, arching across just below the antennal pits. Pronotum irrorate with fuscous except on a median line. Elytra sub-hyaline with the nervures alternately dark and light The bases of all the nervures light, the cross nervure between the sectors broadly light. Ultimate ventral segment of female broadly rounding and shallowly notched in the middle, male plates very broad and short, antennæ without discs

Found on cottonwood at Ames, Iowa.

IDIOCERUS ALTERNATUS Fitch. (Plate III., Fig. 1.)

Idiocerus alternatus Fitch. Homop. N. Y. State Cab., p. 59, 1851.

Bythoscopus alternatus Walk. Homop., III., p. 876, 1851.

Idiocerus alternatus V. D. Can. Ent., XXI., p. 8, 1889. Psyche, V., p. 388. Provancher, Pet. Fauna Ent. Can., III, p. 293. Harrington, Ottawa Nat., VI., p. 31. Osborn, Proc. Ia. Acad. Sci, I., pt. II., p. 126. Cockerell, Trans. Am. Ent. Soc., XX, p. 365; G. & B., Hemip. Colo., p. 73, 1895.

Idiocerus interruptus G. & B. Hemipt. Colo., p. 74, 1895.

Brownish fuscous alternating with white on pronotum and elytra. Face yellowish, usually a fuscous arc outside the two black spots. Length, ♀ 5.25 mm.; ♂, 5 mm.; width, 1.5 mm.

Face yellowish, irregularly mottled in the female, four stripes on the lower part in the male, usually a brownish crescent outside the round spots on vertex. Pronotum brownish, a light stripe on the middle extending on to the vertex and back across the scutellum: scutellum with the broad basal angles and two spots on the disc separated by a bifid brownish line, black. Elytra sub-hyaline, the nervures fuscous interrupted with white, the second sector with several short interrup-

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tions before the transverse nervures, a large circular light spot covering the tips of the outer claval nervures and a smaller one at the apex of clavus. Ultimate ventral segment of female short, nearly truncate, the corners rounding; male plates long and narrow; antennal discs nearly circular.

Occurs abundantly on willows over a very wide area. The adults that hibernate are usually much darker than those of the summer brood. In some sections these have a distinctly rufus cast.

Specimens are at hand from Ontario, New York, Iowa and Colorado. Van Duzee has records of its occurrence in Ottawa, Canada, (Harrington), Ag. Coll. Mich. (G. C. Davis), Quebec (Provancher), California (Coquillett), Franconia, N. H. (Mrs. Slosson). An examination of two of the types of *interruptus*, through the kindness of Prof. Gillette, showed no character by which they could be separated from typical *alternatus*.

Idiocerus verticis Say.

Jassus verticis Say. Jour. Acad. Nat. Sci., Phila., VI., p. 308, 1831.

Bythoscopus verticis Uhler. Bull. U. S. Geol. and Geog. Surv., III., p. 465, 1877.

Idiocerus verticis Van Duzee. Psyche, V., p. 389, 1890; G. & B., Hemip. Colo., p. 80, 1895.

Pale brownish fading to nearly white, except the black spots on vertex and scutellum. Elytra pale brownish, broadly interrupted with light. Length, ♀ 4.5 mm.; ♂, 4.25 mm.; width, 1.10 mm.

Face and all below creamy or greenish yellow; ocelli and spots on the disc black. Pronotum light, washed with brownish, a few oblique dark spots on the anterior part of the disc; scutellum yellowish, basal angles black, tip white. Elytra white, washed with pale brownish, nervures brownish interrupted with white, inner sector with a single long interruption before the transverse nervure, suture with a light spot in the middle. Ultimate ventral segment of female short, truncate; pygofers rather long and narrow, exceeded by the ovipositor, male plate long and slender, antennæ short, with a very large disc which scarcely reaches the clypeus.

Missouri (Say), Denver, Colo. (Uhler).

Found at Ames, Iowa, on willows along with the preceding species, which it most resembles. It is usually of a lighter color, often nearly white. Its smaller size, lighter color, and shorter ovipositor in the

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female will separate it from the preceding species, while the immense discs on the short antennæ render it a strikingly distinct species whatever its color.

In the pale examples the spots on vertex and scutellum are very distinct but in the more heavily irrorate examples they are obscured, while the white markings are very distinct. Thus answering Say's description.

It is probable that many of the references to this species also included *alternatus*.

IDIOCERUS RUFUS G. & B.

Hemiptera of Colorado, p. 80.

Reddish brown, face yellowish, elytra showing alternate light and dark nervures except in the reddest specimens. Length, 5 mm.; width, 1.5 mm.

Face light creamy yellowish, scarcely marked, ocelli brown, pronotum chestnut, a narrow light line and a pale spot either side on the disc, elytra sub-hyaline, the nervures obscured in the redder forms, alternately light marked in the darker ones, pattern of marking similar to *moniliferæ*. Ultimate ventral segment rounding, the center slightly excavated, male plate small, the styles broad and stout, antennæ without discs.

Found on cottonwood at Ft. Collins, Colorado, by Prof. Gillette, through whom the specimens were received. This species was described from two extremely rufus specimens. The majority of the specimens received were darker and showed the light markings on the elytra. The darker forms somewhat resemble *moniliferæ* but all those examined are smaller the face is narrow and lacks the characteristic dark band of that species.

IDIOCERUS MEXICANUS n. sp.

Cinnamon brown, scutellum of a brighter rufous color. Resembles *rufus* but is considerably larger. Length, ♀ 6 mm.; ♂, 5.75 mm.; width, 2 mm.

Head broad, vertex fairly broad, occiput and front nearly parallel, face rather long, triangular, obtusely pointed below, genæ with very straight margins; front and loræ distinctly tumid. Pronotum, width twice the length, posterior margin scarcely emarginate. Elytral veins distinct but not prominent, not tuberculate.

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Color: head, pronotum, elytra, tergum, and touches on under surface and legs, cinnamon brown. The lower part of the face inclines to yellowish and the pronotum and scutellum have irrorations of this color, while the propleura, margins of tergum, the venter and femora are yellow or light stramineous.

Genitalia: Last ventral segment of female scarcely longer than preceding, pygofers broad, rugose or gibbous posteriorly, exceeded by the ovipositor. Male valve short, obtusely rounded behind; plates narrow, finely ciliate.

Described from one female and one male collected by Prof. C. H. T. Townsend, Jicaltepec, Vera Cruz, Mexico, June, 1896.

This species is marked by the large size, tumid front and loræ, and, for the specimens in hand, by the distinct cinnamon brown color.

Idiocerus suturalis Fitch.

Idiocerus suturalis Fitch. Homop., N. Y. State Cab., p. 59, 1851.

Bythoscopus suturalis Walk. Homop., IV., p. 1162, 1852.

Idiocerus suturalis Van Duzee. Canada Ent., XXI., p. 8; Psyche, V., p. 388; Cat., 261; Gillette & Baker, Hemip., Colo., p. 80.

Pale yellowish, a dark brown stripe along the suture, elytral nervures indistinct. Length, ♀ 5.75 mm; ♂, 5 mm.; width, 1.50 mm.

Face rather long, genæ nearly straight-margined below; clypeus much expanded just before apex which extends below the genæ. Face and all beneath yellowish. Elytra yellowish hyaline, the apex dusky, sutural margins broadly marked with brown, sometimes interrupted by a white crescent, often continuing on to the scutellum and the posterior part of the pronotal disc, outer anteapical cell broad, triangular, the nervure curving away to the margin. Ultimate ventral segment of the female about three times wider than long, posterior margin with a roundingly produced median lobe; male antennal disc elongate.

Specimens are at hand from New York and Colorado. Mr. Van Duzee has records of its occurrence for Ag. Coll, Mich. (G. C. Davis), Douglass Co., Kas. (F. H. Snow), Mt. Washington (Mrs. Slosson), Winnipeg (Jas. Fletcher).

This is a somewhat variable species. Those with the darker interrupted stripe are mostly males, though occasionally a female is found.

Van Duzee reports it from willow, poplar and birch.

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IDIOCERUS AMŒMUS V. D.

Idiocerus amœmus Van Duzee. Can. Ent., XXVI., p. 89, 1894; Cat., p. 261.

Greenish, elytra hyaline, pronotum and scutellum olive or fulvous brown. Length, ♀ 5 mm.; ♂ 4.5 mm.; width, 1.5 mm.

Face shorter than in *suturalis*, genæ decidedly convex, reaching the tip of the clypeus. Clypeus widest at apex, the side margins straight. Face unicolorous, yellowish green in the female, two brown stripes below in the male. Pronotum olive brown, washed with fulvous, often marked with lighter. Elytra hyaline, allowing the dark nervures and the green tergum to be seen, outer anteapical cell moderately long. Ultimate ventral segment of the female short, feebly rounded behind, the outer angles obsolete. Male antennal disc moderately large, nearly round.

Occurs on willows. So far specimens have only been received from Colorado and California.

IDIOCERUS PALLIDUS Fitch.

Idiocerus pallidus Fitch. Homop., N. Y. State Cab., p. 59, 1851.

Bythoscopus pallidus Walker. Homop., IV., p. 1162.

Idiocerus unicolor Osborn. Proc. Iowa Acad. Sci., I., pt. II., p. 12, 1892.

Idiocerus obsoletus Walker. Homop., III., p. 873, 1851.

Large, pale greenish, eyes reddish. Length, ♀ 6 5 mm.; ♂, 6 mm.; width, 2 mm.

Face and all beneath pale greenish; eyes reddish brown; pronotum greenish; scutellum greenish; rarely with dark markings on the angles. Elytra greenish, sub-hyaline, nervures indistinct, occasionally the elytra are hyaline showing the dark nervures of the under wing.

Tergum greenish, rarely in dark specimens blackish, a very broad, stout species. The outer anteapical cell long, triangular, rarely wanting. Ultimate ventral segment of female short, posterior margin medially produced into a broad, rounding lobe; pygofers scarcely inflated, exceeded by the stout ovipositor, by the length of the ventral segment; male antennal discs oblong, moderately large.

This is a wide-spread and abundant species occurring on willows. Specimens are at hand from New York, Iowa and Colorado, and it

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has been taken for Quebec (Provancher), Ottawa (Harrington), Clear Creek Canon and Denver (Uhler), Philadelphia (C. W. Johnson).

An examination, by the senior author, of Walker's type of *obsoletus* from "Hudson Bay," led to the belief that it should be referred to this species.

IDIOCERUS DUZEI Prov.

Idiocerus duzei Prov. Pet. Faune, Ent. Can., III., p. 292, 1890.
Idiocerus perplexus G. & B. Hemip. Colo.
Idiocerus pallidus var. Bak. Ent. News, Vol. VIII., p. 54.

Slightly larger than *pallidus*, light yellowish green, the elytra golden iridescent, tipped with fuscous. Length, ♀ 7 mm.; ♂, 6 mm.; width, 2 mm.

Face and below pale greenish white, pronotum greenish, fading out posteriorly; scutellum yellowish, sometimes marked with brown, the tip greenish. Elytra yellowish green at base, sub-hyaline with a golden reflection beyond, becoming smoky at the tip in the female and strongly fuscous in the male; tergum yellowish, sometimes fuscous on the disc. A still broader and stouter-appearing species than the preceding, with longer elytra, the outer branch of the first sector not forming an anteapical cell, or rarely a short triangular one, the outer nervure curving away to the costa. Ultimate ventral segment a little longer than in *pallidus*, the outer angles rounding; pygofers broader, the ovipositor exserted less than the length of the segment, male antennal disc smaller, less than three times the width of the filament.

The specimen from which Provancher described this species was determined as new for America by Prof. Van Duzee, who also determined two other specimens of this species, one from New Hampshire and one from Michigan. These specimens are somewhat darker than most of the Iowa and Colorado ones, but they agree in all the structural details.

Idiocerus perplexus G. & B. was stated to be only a variety of *pallidus* by Baker (Ent. News, Vol. VIII., No. 3, p. 54). An examination of the types, however, show it to be quite distinct from that species but identical with the above.

Found only on the cottonwood at Ames, Iowa. Specimens are at hand from New Hampshire, Michigan and Colorado. Records from Mr. Van Duzee are: Franconia, N. H. (Mrs. Slosson), Ag Coll. Mich. (G. C. Davis), Quebec (Provancher).

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IDIOCERUS NERVATUS V. D.

Bulletin Buffalo Soc. Nat. Sci., V., pt. 4, 1894 (No. 1); Cat., p. 261.

Small, stout, pale green or yellowish, the oblique dark nervures of the under wings showing through the hyaline elytra. Length, ♀ 4.75 mm.; ♂, 4.50 mm.; width, 1.20 mm.

Pale yellowish green, tarsi light green, elytra hyaline, the nervures of the under wing showing distinctly above the green abdomen, outer anteapical cell long, as in *alternatus* and *verticis* Ultimate ventral segment of female scarcely wider than long, posterior margin nearly truncate; male antennal discs small, nearly circular.

Occurs on willows throughout the greater part of the United States, though rarely in very great numbers. Specimens are at hand from New York, New Jersey, Michigan, Iowa, Colorado and Arizona. A very distinct little species, although other species often show the nerve character. It can be readily separated from *pallidus*, which it most closely resembles, by the smaller size and the long, nearly truncate, segment of the female.

UNKNOWN SPECIES.

IDIOCERUS RAMENTOSUS Uhl.

Bythoscopus ramentosus Uhler. Bull. U. S. Geol. and Geog. Surv., III., p. 465, 1877.

Idiocerus ramentosus Van Duzee. Psyche, V., p. 389, 1890. Cat., p. 262; Gillette & Baker, Hemip. Colo., p. 79.

Idiocerus inscriptus Uhler, in litt. (vide Van Duzee).

As described, this species should be "pale testaceous more or less clouded with rust brown and fulvous," "vertex with a round black spot each side, and a smaller black dot each side interior to the ocelli; face sometimes irregularly marked with small brown spots and lines, those above being arranged transversely and those below in a horse-shoe arc."

Specimens of both *lachrymalis* and *alternatus* have been received labeled *ramentosus* and it is probable that most of the references for this species should be credited to one or the other of these.

Some of the darker specimens of *rufus* show traces of black spots on the vertex and answer the description fairly well except for the face markings. If specimens are found with these also it is possible that

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ramentosus will be found to occur on cottonwoods instead of willows, as described, and include both *rufus* and *moniliferæ*, although the material now at hand will not warrant such a conclusion.

IDIOCERUS STRIOLA Fieb.

Idiocerus striola Fieb. Verh. zool-bot., Gesell. Wien, XVIII., p. 453, 1868; Van Duzee, Cat., p. 262.

This was originally described by Fieber as a European species in 1868, and so listed in his catalogue, 1872, crediting it to "Sithka"* each time. It is evidently another of the alternate veined series and may well be *alternatus* of Fitch, as that species is already known to be widely distributed and the darker specimens, such as would be expected to occur in such high latitude, answer the short description.

Idiocerus distinctus G. & B. Hemipt. Colorado, p. 75.

The description of this species was drawn up from a single female and is wanting in several essential points, so that without an examination of the type, which unfortunately has disappeared from the Colorado collection, it can not be accurately placed.

Steamboat Spring, Colo., on willow (G. & B.).

Idiocerus mimicus G. & B. Hemipt, Colorado, p. 76.

The type of this species is also lacking from the Colorado collection, which is still more unfortunate, as there is a discrepancy between the description and the figure that accompanies it; the description giving the pronotum as unicolorous, while the figure shows four large black spots on the disc.

Fort Collins, Colorado, on black walnut (G. & B.).

* "Sithka" (Fieber), "Sitka" (V. D. in Catalogue).

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CONTRIBUTIONS TO THE ENTOMOLOGY OF NEW MEXICO.

BY T. D. A. COCKERELL,

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I. A CATALOGUE OF THE FOSSORIAL HYMENOPTERA OF NEW MEXICO.

MUTILLIDÆ.

This family is at present being revised by Mr. Fox, who will treat of several new or little-known species found in New Mexico, but here omitted.

Mutilla sanctæ-feæ, Ckll. & Fox — Santa Fé.

Ephuta virguncula, Blake, is reported from New Mexico; *E. californica*, Rad., *E. bioculata*, Cress., and *E. fulvohirta*, Cress., were taken by Dr. S. Lewis in 1867.

E. bexar, Blake — Continental Divide, Tenaja and Chaves (Townsend).

E. occidentalis, L. — Continental Divide, Tenaja (Townsend).

E macra, Cress., det. Fox — Chaves, one ♂ (Townsend).

E. californica, Rad. — Santa Fé. The beautiful var. *euchroa*, Ckll., occurs at Coolidge and Embudo.

E. ægina, Cress., det. Fox — Santa Fé, August (Edw. L'Engle). I think this Santa Fé insect should be called *E. bellona*, Cress., of which *ægina* is probably a variety.

E. townsendi, Ckll. — Mr. Fox has referred to this species a specimen from Santa Fé (*V. Boyle*), and as a variety, one from Albuquerque, June 30 (Ckll.). They seemed to me hardly typical of *townsendi*.

E. contumax, Cress., det. Fox — Santa Fé, July 30.

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E. propinqua, Cress., det. Fox — La Tenaja near Santa Fé, Aug 1895 (*Myrtle Boyle*).

E. snoworum, Ckll. & Fox — Albuquerque (*Snow*).

E. coccineohirta, Blake, det. Fox — Santa Fé, Aug. 5; and rath common in the Mesilla Valley. The specimens are not typical coloration.

E. creusa, Cress — Mesilla Valley, rather common.

E. gloriosa subsp. *pseudopappus*, Ckll.— Not rare in the Mesil Valley. Grant County (*Howard*).

E. gorgon, Blake — Mesilla Park, not rare.

E. scævolella, Ckll. & Casad — Mesilla Valley, rare.

E. foxi, Ckll.— Very common in Mesilla. The female was d scribed as *S. hetersohroa*, Ckll. & Casad, and is found with mal which differ only a little, and that in color, from the original males *foxi* from Mexico.

E. marpesia, Blake — Las Cruces, rare.

E. orcus, Cress.— Very common in the Mesilla Valley.

E. mixtura, Blake, det. Fox — Mesilla Park, on campus of Agricu tural College, Sept. 16.

E. donæ–anæ, Ckll. & Fox — Mesilla Valley, rather common.

E. vesta, Cress , det. Fox — Mesilla, Sept. 3.

Chyphotes elevatus, Blake — Santa Fé.

C. picus, Ckll.— Santa Fé and Mesilla Valley. Perhaps the ♂ *elevatus*

C. belfragei, Blake, and var. *melaniceps*, Blake — Mesilla Valley.

C. peculiaris, Cress. (*mirabilis*, Ckll.) — Mesilla Park.

Photopsis territus, Ckll., *P. nubecula*, Cress., *P. astyanax*, Blake, *P. concolor*, Cress., *P. danaus*, Blake, *P. clara*, Blake, var. *P. tapajo* Blake, and *P. mesillensis*, Ckll., all come to light in the Mesilla Va ley. The last two were taken at Mesilla.

P. nokomis, Blake, det. Fox — Santa Fé.

Brachycistis castaneus, Cress., *B. glabrellus*, Cress., *B. perpunctatu* Ckll., *B. lepidus*, Blake, *B. idiotes*, Ckll., and *B. elegantulus*, Ckll. Casad, all occur in the Mesilla Valley.

Methoca stygia, Say, det. Ashm.— Mesilla, June 26.

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PHILANTHIDÆ.

Philanthus ventilabris var. *frontalis*, Cress., and *P. henricus*, Dunn, were taken by Townsend on the Gila River.

P. ventilabris, Fab.— Socorro, June 29. Var. *frontalis*, Cress; Mesilla Valley.

E. punctatus, Say, var. *cockerelli*, Dunn.— Common in the Mesilla Valley. At Rincon, July 5, at flowers of *Chilopsis linearis*, I took a form with rufous femora. This same form, which may be named f. *chilopsidis*, also occurred in Las Cruces, June 5, at flowers of *Chilopsis linearis*, one ♀. Another ♀, taken with the last-mentioned, has the femora basally black and apically rufescent.

P. pacificus, Cress.— Mesilla Valley, not rare.

P. annæ, Dunn.— Mesilla Valley. The specimen so referred by Dunning, from Las Cruces, was perhaps *multimaculatus*.

P. multimaculatus, Cam.— Mesilla Valley, rather rare.

P. cleomæ, Dunn.— Mesilla Valley; campus of Agricultural College, Sept. 5, on *Isocoma wrightii*.

P. gloriosus, Cress.— Mesilla Park, Oct. 11, 1893. (*Agnes Williams.*)

P. scelestus, Cress., det. Dunn.— Santa Fé, Aug. 5.

P. psyche, Dunn.— Mesilla Valley.

P. albopilosus, Cress., det. Fox — Las Cruces, Aug. 24, on *Solidago canadensis* subsp. *arizonica*.

Aphilanthops quadrinotatus, Ashm., *A. taurulus*, Ckll., and *A. laticinctus*, Cress., occurs in the Mesilla Valley. The second is found also at Rincon, and the third at Santa Fé.

A. concinnulus, Ckll.— Rincon Mr. Dunning has referred the ♀ of this to *utahensis*, Baker, but I feel certain it is distinct, and belongs with the males found associated with it.

Eucerceris zonatus, Say — Las Cruces (*Townsend*).

E. canaliculatus, Say — Las Cruces (*Townsend*).

E. montanus, Cress.— Las Cruces (*Townsend*).

E. vittatifrons, Cress., var. *tricolor*, Ckll., was described from the Mesilla Valley.

E. fulviceps, Cress., was described from New Mexico.

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Cerceris acanthophilus, Ckll.— Mesilla Valley; Deming. Mr. Fox formerly referred a Mesilla Valley example to *C. finitima*, Cress., but it was probably *acanthophilus*.

C. venator, Cress.— Las Cruces and El Rito (*Townsend*).

C. bicornuta, Guér.—Recorded by Townsend from Vega S. José.

C. frontata, Say — Vega S. José (*Townsend*).

Some other N. M. Philanthidæ still await study.

BEMBECIDÆ.

Sphecius speciosus var. *grandis*, Say— Common in the Mesilla Valley.

Stizus flavus, Cam., var. *subalpinus*, n. var.— ♂. Differs from the type, as described by Cameron, by having the fuscous pubescence of the head and thorax paler and scant, in fact scarcely noticeable, and the black markings much reduced, so that the abdomen may even become immaculate yellow above; while the hind tibia has no black streak.

Hab.— Santa Fé, N. M., at flowers of an unbellifer in July. (*Ckll.*)

Stizus godmani, Cam., and *S. unicinctus*, Say — See Bull. 15, N. M. Agr. Exp. Sta., p. 65.

Bembidula capnoptera, Handl., var. *mesillensis*, n. var.— ♂. Legs black and yellow, instead of ferruginous, the black including much of the basal halves of the femora, the tibiæ and tarsi wholly yellow. Wings with a strong fuscous stain immediately basad of the marginal cell, suffused in all directions, but otherwise nearly clear.

Hab.— Las Cruces, N. M., probably collected by Prof. C. H. T. Townsend.

B. variegata, Oliv.— Fox reports a specimen in Coll. Ashmead, from Albuquerque. It was doubtless collected by Wickham, though this is not stated.

Bembex similans, Fox, and *B. occidentalis*, Fox — See Fox, Proc. Phila. Acad., 1895, pp. 359-362.

B. spinolæ, Lep.— Santa Fé, July 10. (*Boyle*); det. Fox.

Microbembex monodonta, Say — Common in the Mesilla Valley; also taken at Albuquerque.

Monedula pulchella, Cress., det. Fox — Las Cruces, June 13, preying on *Lycæna marina*, Reak.

M. speciosa, Cress., det. Ashm.— Mesilla, June 26.

Steniolia duplicata Prov.— Common in the Mesilla Valley.

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NYSSONIDÆ.

Nysson texanus, Cress., is common, and *N. solani*, Ckll., rare, in the Mesilla Valley.

Gorytes pygidialis, Fox, *G bigeloviæ*, Ckll. & Fox, and *G. crucis*, Ckll. & Fox, were described from the Mesilla Valley.

G. propinquus, Cress., and *G. tricolor*, Cress., were described from specimens collected by Dr. S. Lewis in northern New Mexico in 1867. I have taken *G. tricolor* at La Junta, Colorado.

G. venustus, Cress. — Santa Fé, see Bull. 15, N. M. Agr. Exp. Sta., p. 63.

G. spilopterus, Handl. — Organ, N. M., 5100 ft., Sept. 28, 1896.

G. bipunctatus, Say, det. Fox — Common in the Mesilla Valley. Once at Santa Fé, on a hop vine.

G. hamatus, Handl. — One (det. Fox) coll. by Elgin Holt at Las Cruces, May, 1896.

G. eximius, Prov., det Fox — On *Bigelovia* in the Mesilla Valley.

G. moneduloides, Pack., det. Fox — Mesilla Valley in August.

G. phaleratus, Say — Mesilla, June 7, etc.

LARRIDÆ.

Trypoxylon texense, Sauss., and what I take to be *T. tridentatum*, Pack., occur in the Mesilla Valley, the former being very common. *T. texense* was found also at Vega S. José (*Townsend*).

Notogonia argentata, Bve., is common in the Mesilla Valley.

Ancistromma chilopsidis, Ckll. & Fox, was described from Rincon; *A. rugosa*, Fox, is reported from New Mexico, but the locality of capture is unknown. It was probably taken by Wickham.

Tachytes distinctus, Sm.— Common in the Mesilla Valley.

T. exornatus, Fox — Mesilla Valley; also at Colora'o, near Rincon.

T. spatulatus, Fox — Santa Fé, see Bull. 15, N. M. Agr. Exp. Sta., p. 74.

T. fulviventris, Cress., is recorded by Townsend from Chaves and Sabinal; and *T. abdominalis*, Say, was taken by Dr. S. Lewis in 1867.

Tachysphex amplus, Fox, is recorded by Fox vaguely from "New Mexico."

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T. fusus, Fox, was partly based on Mesilla Valley material.

T. terminatus, Smith — Mesilla Valley; the first specimen was collected by Mr. F. Garcia.

Plenoculus cockerelli, Fox — Common in the Mesilla Valley; also taken at Rincon.

P. parvus, Fox — The type specimen was taken at Las Cruces early in September.

P. propinquus, Fox, var. *rufescens*, n. var. — Basal portion of abdomen suffused with reddish. Santa Fé, N. M., Aug. 8 (*Myrtle Boyle*).

Astatus bigeloviæ, Ckll. & Fox, was described from the Mesilla Valley.

A. nevadicus, Cress. — Santa Fé, July 28, 1895. Mesilla, on *Solanum elæagnifolium*, Aug. 25, 1896. The Mesilla insect I thought distinct, but Mr. Fox refers it to *nevadicus*.

A. elegans, Cress., det. Fox — Santa Fé and the Mesilla Valley.

A. bicolor, Say, det. Fox — Mesilla Valley (*Clarence Rhodes*); also Santa Fé.

A. bellus, Cress., det. Fox — Mesilla Valley, on *Bigelovia*.

A. nubeculus, var. *nigropilosus*, Cress., det. Fox — Mesilla Valley.

A. asper, Fox, det. Fox — Mesilla Valley (*Clarence Rhodes*).

Miscophinus arenarum (Ckll.) — Mesilla Park.

Sapygidæ.

Sapyga pumila, Cress., det. Fox — Santa Fé, July 7.

Scoliidæ.

Tiphia — We have one or more species, not yet studied.

Paratiphia albilabris, Lep. — Common in the Mesilla Valley; also taken at Albuquerque.

Myzine frontalis, Cress. MS., det. Fox — Rincon and the Mesilla Valley. This is a ♀ *Myzine* about 13 mm. long, black and yellow, with hyaline wings. Legs black, hind tibiæ slightly rufescent; abdomen shiny; thorax with yellow marks; head above with a black triangle enclosed in a yellow one.

M. confluens, Cress., det. Fox — Rincon, July 6, on *Baccharis*.

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M. hamata, Say, det. Fox — Colora'o, near Rincon, July 11, at flowers of *Koeberlinia spinosa*, Zucc.

M. hyalina, Cress.— Common in the Mesilla Valley; on June 14, I found the males flying in a swarm, in great numbers.

Scolia flavocostalis, Cress., and *S. lecontei*, Cress., were taken by Dr. S. Lewis in 1867.

S. lecontei, Cress., *S. dubia*, Say, and *S. dubia*, var. *hæmatodes*, Burm., are recorded by Townsend from Vega S. José.

S. ridingsii, Cress., det. Ashm., was taken behind the Agricultural College, Mesilla Valley, June 27, on mesquite.

We have also two doubtful species of *Scolia*; one, from Lone Mountain, is called by Mr. Fox *S. costata*, but I find no such name in the catalogues; the other, from the Mesilla Valley, is stated by Mr. Fox to be near *S. consors*.

Elis xantiana, Sauss., and *E. zonaria*, Cress., were taken by Dr. S. Lewis. The former is not uncommon in the Mesilla Valley.

E. plumipes, Drury, has been taken by Townsend in the Mesilla Valley. I have also an Albuquerque specimen, received years ago from Mr. Ashmead; it was probably collected by Prof. Wickham. I took a specimen at Bernalillo early in July.

POMPILIDÆ.

Pompilus æthiops, Cress.— Recorded by Townsend from Vega S. José.

P. ferrugineus, Say — Recorded by Townsend from the Gila River.

P. marginatus, Say, det. Fox — Rincon, July 5.

P. porus, Fox, det. Fox — Las Cruces, June 5, on *Chilopsis linearis*. A species of Lower California, now first reported from the U. S.

P. relativus, Fox, det. Fox — Las Cruces, July and August.

P. torridus, Smith, det. Fox — Las Cruces, July 12. A Mexican species, now first reported from the U. S.

P. parvus, Cress.(?), var , det. Fox — Mesilla, Oct. 29. Blue-black, 9 mm. long; abdomen quite bluish; upper wings fuliginous, lower wings hyaline except the ends.

Aporus fasciatus, Smith, det. Fox — Mesilla Park, April.

I have also taken a doubtfully new *Aporus* in the Mesilla Valley.

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Priocnemis terminatus, Say, det. Fox — Albuquerque, June 30.

Ceropales fulvipes, Cress.— Collected by Townsend in the Mesilla Valley.

C. fraterna, subsp. *occidentalis*, Ckll.— Ruidoso, about 6500 ft. (*Townsend*).

Pepsis formosa, Say — Common in the Mesilla Valley. The females agree with *formosa*, but the males are *P. chrysothemis*, R. Lucas. Some specimens (♂♀) taken by Prof. Townsend at Las Cruces have the wing-coloring of *P. nephele*, R. Luc., which should be known as *P. formosa* var. *nephele*. The *P. formosa* of Lucas, distinct by the characters of the ♂ abdomen (See Fox's table, Proc. Ent. Soc. Wash., IV., 142), is apparently not known from the region whence came Say's type, being more southern in its distribution. It may be called *P. pseudoformosa*.

Mixed with the males of *P. formosa*, I find I have a *Mygnimia* (presumably *M. ustulata*, Dahlb.) looking exactly like them. It was taken at Las Cruces by Prof. Townsend.

SPHÈCIDÆ.

Ammophila wrightii, Cress., and *A. varipes*, Cress., were collected by Dr. S. Lewis in 1867.

A. argentifrons, Cress., is not uncommon at Santa Fé.

A. communis, Cress., det Fox — Gila River (*Townsend*).

A. luctuosa, Smith, det. Fox — Santa Fé, July 21.

A. yarrowi, Cress., det. Fox — Santa Fé, June 21.

A. pictipennis, Walsh, det. Fox — Las Cruces.

A. pruinosa, Cress., det. Fox — Common in the Mesilla Valley; taken at flowers of *Solanum elæagnifolium*, *Aster spinosus*, *Chrysanthemum* (cult.), *Melilotus indica* and *Bigelovia* or *Isocoma heterophylla* var. *wrightii*.

A. varipes, Cress., det. Fox — Las Cruces, July 13.

A. vulgaris, Cress. (?), det. Fox — Las Cruces, June.

A. ferruginosa, Cress.—Mesilla Valley.

A. sp. incert., det. Fox — Las Cruces, July 12. About 28 mm. long, abdomen red with a black dorsal patch, legs red.

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Pelopæus servillei, Lep.— Mesilla Valley, very abundant. Also at El Rito (*Townsend*) and Albuquerque (*Ckll.*).

Sphex ichneumonea, L. — Santa Fé (*Ckll.*), Vega S. José (*Twns.*), El Rito (*Twns.*).

S. belfragei, Cress.— Las Cruces, June 9.

S. nearcticus, Kohl— Common in the Mesilla Valley.

S. cæruleus, L.— Vega S. José, according to Townsend.

S. occultus, Kohl — Vega S. José and El Rito (*Townsend*).

Prionony x thomæ, Fabr., was taken by Dr. S. Lewis.

P. atrata, Lep., is common at Santa Fé.

P. foveotatus, Tasch., det. Fox — Taken by Townsend in great numbers on the Gila River.

MIMESIDÆ.

Psen frontalis, Fox, and *P. suffusus*, Fox, occur in the Mesilla Valley; the latter also at Rincon.

PEMPHREDONIDÆ.

Spilomena pusilla, Say — Las Cruces, June 4.

S. foxii, Ckll. – Santa Fé.

Diodontus gillettei, Fox, det. Fox, ♂— Mesilla Park, on *Sophia*, March 31, 1896.

D. leguminiferus, Ckll. and Fox — Santa Fé, July 10.

D. nigritus, Fox, det. Fox — Mesilla Park, at *Melilotus indica*, May.

D. rugosus, Fox, det. Fox — Santa Fé, July 5, at foliage of apricot.

D. occidentalis, Fox, det. Fox — Las Cruces.

Stigmus inordinatus, Fox, det. Fox — Santa Fé, Aug. 18, in Archbishop Lamy's garden.

S. fraternus, Say, det. Ashm.— Mesilla, Aug. 29, on *Isocoma wrightii*.

Ammoplanus mandibularis, Ashm. MS.— Santa Fé, July 19.

A. lævis, Prov., det. Ashm.—Mesilla, May; Mesilla Park, June 24. I have also taken it at El Paso, Texas. The species was described as an *Anacrabro*.

Passaloecus annulatus, Say — Santa Fé, July 10.

P. armeniacæ, Ckll. & Fox — Santa Fé, July 4.

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CRABRONIDÆ.

Anacrabro boerhaaviæ, Ckll. — Mesilla Valley.

Crabro dilectus, Cress., is recorded by Townsend from the Continental Divide, Tenaja.

C. packardii, Cress.— Ruidoso, about 6500 ft., July 21, on flowers of *Cicuta occidentalis;* coll. Townsend.

C. minimus, Pack., *C. centralis*, Cam., *C. errans*, Fox, *C. decorus*, Fox, *C. salicis*, Ckll., and *C. abdominalis*, Fox, occur in the Mesilla Valley. The record of *C. minimus* is based on a ♂ identified by Fox in 1893, but as the locality is not mentioned in his later revision of *Crabro*, there may have been some error. *C. abdominalis* was recognized recently by Fox in a specimen taken on *Isocoma wrightii* at Mesilla Park, Sept. 12. *C. decorus* I took at Mesilla, May 8, burrowing in a sandbank.

C. errans, Fox, also occurs at Santa Fé, in August.

C. maculiclypeus, Fox, det. Fox — Santa Fé, July 10.

Oxybelus quadricolor, Ckll. & Baker, *O. trifidus*, Ckll & Baker, *O. quadrinotatus*, Say, and var. *montanus*, Rob., occur at Santa Fé.

O. heterolepis, Ckll. & Baker, and var. *defectus*, Ckll. & Baker, *O. packardii*, Rob., and *O. cornutus*, Rob., are found at Albuquerque.

O. sparideus, Ckll., *O. subcornutus*, Ckll., *O. quadricolor*, C. & B., *O. coloradensis*, Baker, *O. cornutus*, Rob., and *O. abdominalis*, Baker, occur in the Mesilla Valley, the last taken by Townsend.

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CONTRIBUTIONS TO THE ENTOMOLOGY OF NEW MEXICO.

BY T. D. A. COCKERELL.

II. SOME RECORDS OF DIPTERA.

I have in manuscript a catalogue of New Mexico Diptera, brought up to date, but there would be no special advantage in publishing it at the present time. Prof. Townsend has before him a considerable collection of New Mexico Diptera awaiting study, and it is to be hoped that he will eventually catalogue the species of the Territory. The present records are based on specimens collected by myself (unless otherwise stated), and determined by Mr. Coquillett. Most of the specimens are in the National Museum. In a few cases, duly indicated, the determinations are not Mr. Coquillett's.

CECIDOMYIDÆ.

Asphondylia sp.— At Santa Fé, in August, I took a species which I suppose to be new, remarkable for its white tarsi.

MYCETOPHILIDÆ.

Sciara dimidiata, Say — Mesilla, April 19, on flowers of *Nasturtium sinuatum*.

Sciara inconstans, Fitch.— Mesilla, June 11, breeding in a box of plants in the house. They perished in numbers from the attacks of an *Empusa*, which Dr. R. Thaxter said appeared to be different from any species he had seen, unless it might be *E. gloeospora*, Vuill.

Neoglaphyroptera winthemii, Lehm.—Santa Fé, Aug. 5.

Eugnoriste occidentalis, Coq.— Mesilla Valley, very abundant.

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BIBIONIDÆ.

Scatopse pulicaria, Loew.— Mesilla, under bark of apple tree, Nov. 16.

CULICIDÆ.

Culex consobrinus, Desv.— Santa Fé ♂, July 5; ♀, July 29.

Culex excitans, Walk.— Santa Fé.

Culex impiger, Walk — Colora'o near Rincon, July 10.

Culex stimulans, Walk — Mesilla, Oct 26. Also found at Juarez (State of Chihuahua), Mexico, May 12.

Anopheles punctipennis, Say — Colora'o near Rincon, July 10.

CHIRONOMIDÆ.

Chironomus tricinctus, Meig.— Santa Fé, July 5.

PSYCHODIDÆ.

Psychoda minuta, Banks — Las Cruces, Feb. 25. On Nov. 9 I took a specimen in Mesilla on an apple tree; this was determined by Mr. Banks.

TIPULIDÆ.

Symplecta punctipennis, Mg.— Mesilla. April 22, at light.

STRATIOMYIDÆ.

Nemotelus canadensis, Loew.— Albuquerque, Aug. 16, on *Isocoma heterophylla*.

ASILIDÆ.

Atomosia puella, Wied.— Mesilla, July 20.

Mallophora fautrix, O. S.— Mesilla, July 22.

Mallophora guildiana, Will.— Las Cruces, Aug 5.

Erax varipes, Will.— Socorro, June 29.

Erax albibarbis, Macq.— Mesilla Park, June 17. *E. cinerascens*, Bell., which is supposed to be conspecific with *albibarbis*, was taken at Albuquerque and Las Cruces.

Erax dubius, Will.— Las Cruces.

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Erax latrunculus, Will., occurs in the Mesilla Valley.

Proctacanthus milbertii, Mcq — Las Cruces.

Proctacanthus philadelphicus, Mcq.— Las Cruces, preying on *Synchloe lacinia*.

APIOCERIDÆ.

Apiocera haruspex, O. S.— Mesilla Park, May 21.

BOMBYLIDÆ.

Anthrax effrena, Coq.— Deming, July 9. Also in the Mesilla Valley.

Anthrax lateralis, Say — Rincon, July 6. Santa Fé, July 21, on *Argemone platyceras*.

Anthrax curta, Loew.— Las Cruces, July 23, on *Solanum elæagnifolium*.

Anthrax costata, Say — Las Cruces, Aug. 24, on *Solidago canadensis arizonica*.

Anthrax sinuosa, Wied.— Dripping Spring, Organ Mts., April.

Anthrax muscaria, Coq. — Las Vegas, July.

Anthrax syrtis, Coq. — Mesilla Park, April 26, at flowers of *Aphanostephus ramosissimus*.

Anthrax edititia, Say — Mesilla Park, Sept. 17, on *Pectis papposa*.

Anthrax eudora, Coq.— Mesilla Park, Sept. 17.

Argyramœba daphne, O. S.— Santa Fé, Aug. 16 (Veer Boyle), Aug. 2.

Argyramœba œdipus, Fab.— San Augustine (base of Organ Mts.), Aug. 29. Mesilla Park, Sept.

Sparnopolius fulvus, Wied.— Las Cruces, Oct. 5, on *Verbesina encelioides*.

Comastes robustus, O. S.—Albuquerque, June 30.

Anastœchus nitidulus, Fabr.—Mesilla Park, Sept.

Lordotus junceus, Coq.— Mesilla Park, Sept. 17, on *Pectis papposa*.

Phthiria sulphurea, Loew.— San Marcial, June 28, on *Larrea tridentata*. Mesilla Park, Sept. 17, on *Pectis papposa*.

Phthiria scolopax, O.S.— Mesilla Park, Sept. 11, on *Isocoma wrightii*; April 26, at flowers of *Aphanostephus ramosissimus*.

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Geron senilis, Fab.— Las Cruces, Aug. 25.

Geron trochilus, Coq.— Mesilla Park, Sept. 17, on *Pectis papposa*.

Toxophora pellucida, Coq. - Mesilla Park, April 26.

THEREVIDÆ.

Psilocephala platancala, Loew. — Rincon, July 5, on mesquite. Roswell, April 15.

Psilocephala rufiventris, Loew.— Las Cruces.

Psilocephala hæmorrhoidalis, Macq.— Las Cruces. Santa Fé, July 3, on foliage of box-elder.

SCENOPINIDÆ.

Scenopinus occidentalis, Coq.— Mesilla, Sept. 1.

EMPIDÆ.

Drapetis divergens, Loew.— Santa Fé, end of July.

Tachydromia postica, Walk.— Mesilla, on *Sambucus mexicanus*.

Mythicomyia rileyi, Coq.— Mesilla Park, April 12. Swept from *Sophia halictorum*.

Platypalpus æqualis, Loew.— Las Cruces. Santa Fé, July 24.

Platypalpus trivialis, Loew.— Santa Fé, June 25, on almond.

DOLICHOPODIDÆ.

Dolichopus coloradensis, Aldr., ♀, det. Aldrich.— Santa Fé, July 3, on foliage of box-elder.

Dolichopus obcordatus, Aldr., det. Aldrich.— Santa Fé, Aug. 18, in Archbishop Lamy's garden.

Hercostomus, n. sp., det. Aldrich.— Santa Fé, July 3.

Porphyrops nigricoxa, Loew., det. Coq.—Santa Fé, July 6.

Diaphorus leucostomus, Loew., det. Coq.— Mesilla Valley.

Chrysotus sp., ♂, ♀, det. Aldrich.— Las Cruces, June 10, swept from alfalfa.

Hydrophorus, n. sp., det. Aldrich.— San Augustine Ranch, Organ Mts., Aug. 28.

Psilopus melampus, Loew., det. Aldrich.— Santa Fé, July 3, on foliage of box-elder.

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CONOPIDÆ.

Zodion splendens, Jaenn.—Deming, July 9.

PIPUNCUDIDÆ

Pipunculus subopacus, Loew.— Mesilla, Oct 26.

ŒSTRIDÆ.

Œstrus ovis, L., det. Ckll.—Anton Chico, 1898. (J. M. Abercrombie.)

TACHINIDÆ.

Archytas lateralis, Macq.— Mesilla, April 18, at flowers of plum.

Tachina mella, Walk.— Mesilla Park, Sept. 12, on *Isocoma wrightii*. This was *T. orgyiæ*, Twns., now referred to *mella*.

Senotainia rubriventris, Macq.— Mesilla Park, Oct. 27. *S. flavicornis*, Twns., now referred by Coquillett to *rubriventris*, was taken at Santa Fé, July 5.

Paradidyma singularis, Twns., (i. e., *P. magnicornis*, Twns., now referred to *singularis*). Little Mountain, Mesilla Valley, March 26, on *Streptanthus carinatus*.

Linnæmyia comta, Fall.— Santa Fé, Aug. 2, on *Asclepias*.

Sturmia inquinata, V. d. W.— Mesilla, bred from a *Phlegethontius* larva found by Miss Alice Casad.

Distichona varia, V. d. W.— Rincon, July 5, on *Chilopsis linearis*. Las Cruces, Aug. 25, on *Solidago canadensis arizonica*. Las Cruces, Aug. 25, caught by a *Phymata*.

Euphorocera claripennis, Macq.— Mesilla Park, Sept. 12, on *Isocoma wrightii*.

Exorista confinis, Fall. (i. e., *E. theclarum*, Scudd., now referred to *confinis*). Mesilla Valley, bred from *Lycæna exilis*.

Myiophasia ænea, Wied. (i.e., *Phasioclista metallica*, Twns.). Santa Fé, July 6.

Epigrimyia robertsonii, Twns.— Santa Fé, July 5.

Chætogædia crebra, V. d. W.— Mesilla, Oct. 26.

Paradidyma singularis, Twns.— Las Cruces, end of August. This species moves its wings up and down in a curious manner.

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Drepanoglossa lucens, Twns — Santa Fé, July 6.

Alophora occidentis, Walk. — Colora'o near Rincon, July 10.

SARCOPHAGIDÆ.

Sarcophaga georgina, Wied.—Hagerman (Pecos Valley); Las Cruces; Santa Fé, July 17.

Sarcophaga sarraceniæ, Riley—San Marcial, June 28; Las Cruces. October.

Sarcophaga incerta, Walk.—Las Cruces; Mesilla Park, April 9. at flowers of plum.

MUSCIDÆ.

Lucilia cæsar, L.— Mesilla, Nov. 4, at decaying apples.

Lucilia cornicina, Fb.— Mesilla, Nov. 20, at decaying apples.

Calliphora erythrocephala, Meig.— Mesilla Valley and Santa Fé.

Muscina stabulans, Fall. — Santa Fé, June.

Muscina cæsia, Meig.— Mesilla, Nov. 20, at decaying apples.

ANTHOMYIDÆ.

Ophyra leucostoma, Wied.— Santa Fé, July 3.

Anthomyia pluvialis, L.— Santa Fé, July.

Homalomyia scalaris, Fb.— Santa Fé, July 3. Raton, July 14.

Hcmalomyia canicularis, L., det. Johnson — Santa Fé, June 20.

Cœnosia fuscopunctata, Macq.— Mesilla.

Cœnosia lata, Walk.— Mesilla, Oct. 27.

HELOMYZIDÆ.

Blepharoptera cineraria, Loew.— Mesilla, Nov. 16, on trunk of an apple tree.

MICROPEZIDÆ.

Micropeza producta, Walk.— Mesilla, on *Sambucus mexicana*.

ORTALIDÆ.

Anacampta latiuscula, Loew.— Las Cruces, May. (Miss Agnes Williams.)

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Œdopa capito, Loew.— Mesilla Park, Sept. 12, on *Isocoma wrightii*.

Chætopsis debilis, Loew.— Mesilla, Oct. 26. The type locality is Cuba!

TRYPETIDÆ.

Trypeta genalis, Thoms.— Mesilla.

Trypeta tapetis, Coq.— Santa Fé, June 27, on alfalfa.

Trypeta bella, Loew.— Mesilla, on *Yucca*.

Trypeta (*Urellia*) *solaris*, Loew.— Las Cruces, Sept. 8, on *Isocoma wrightii*.

Trypeta abstersa, Loew.— Mesilla Park, April 12, swept from *Sophia halictorum*.

Trypeta (*Spilographa*) *flavonotata*, Macq.—Mesilla; Santa Fé, July 6.

Trypeta electa, Say — Las Cruces, July 12.

Trypeta (*Carphotricha*) *culta*, Wied., det. Ckll. and W. A. Snow. Las Cruces, July 29.

SAPROMYZIDÆ.

Pachycerina verticalis, Loew.— Mesilla Valley.

Pachycerina limbipennis, Coq.— Santa Fé, July 5.

SEPSIDÆ.

Sepsis violacea, Meig — Mesilla Park, Sept. 12, on *Isocoma wrightii;* Florida, on *Actinella*, July 6.

Sepsis cynipea, L. – Santa Fé, July 6; Mesilla.

DROSOPHILIDÆ.

Drosophila ampelophila, Loew., det. Ckll.— Abundant in Mesilla.

Drosophila graminum, Zett.— Mesilla.

Drosophila apicata, Thoms — Mesilla.

Drosophila adusta, Loew.— Mesilla.

Drosophila funebris, Fabr.— Mesilla.

OSCINIDÆ.

Siphonella flavipes, Coq. MS.— Santa Fé, July 19.

Mosilus æneus, Fall – Rincon, on *Chilopsis linearis*, July 5.

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AGROMYZIDÆ.

Leucopis bella, Loew. — Organ, (5100 ft.), Sept. 28.

Agromyza æneiventris, Fall. — Mesilla Park, Oct. 27.

Agromyza platyptera, Thoms. — Mesilla, on *Sambucus mexicana*.

Odontocera dorsalis, Loew. — Santa Fé, July 5.

In Bull. 10, N. S., Div. Ent., Dept. of Agriculture, (1898), p. 77. Mr Coquillett has some notes on *Leucopis bellula*, Will. The specimens bred from *Orthezia nigrocincta* were from Tularosa Creek, near the Mescalero Agency; not from Mesilla. It may be added that the specimens from Mexico were found at Valles (San Luis Potosi), preying on *Eriococcus dubius*, Ckll.

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SUPPLEMENT TO A REVISION OF THE MELANOPLI.

BY SAMUEL H. SCUDDER.

Since the publication a year ago of my Revision of the Melanopli (Proc. U S. Nat. Mus., XX , 1–421, pl. 1–26), and in part, at least, in consequence of it, a considerable number of new forms have been discovered. In some cases these require considerable modification of the tables there prepared for the determination of the different species, especially in the genus Melanoplus, to which all but two of the new species belong. I have thought it advisable, therefore, to bring the descriptions of the new forms together and to introduce such alterations in the different tables as will enable one to place any of the new forms (both those here described and those described by others this year) as easily as the old.

Most of the species here described were obtained by the careful collecting of Mr. A. P. Morse along the Pacific coast from southern California to northern Oregon, in the summer of 1897. Of these Mr. Morse has given me the full use. The others are principally due to the efforts of Mr. C. F. Baker, Dr. J. L. Hancock and Prof. Otto Lugger, to whom I am indebted for their forwarding of material.

I follow in this paper the order of my Revision, to which I have constantly to refer.

PODISMA Latreille.

In an interesting paper on "The Grasshoppers and Locusts of New Zealand and the Kermadec Islands" (Trans. N. Zeal. Inst., XXX., 135–150, pl. 14, 1897), Capt. F. W. Hutton describes four species which he refers to the genus Pezotettix Burm. (=Podisma Latr.). This is the first reference of the genus to the southern hemisphere, Japan being the nearest country in which the genus was known; but I think it a mistaken reference. I have not seen any specimens of the species described by him, but he has kindly sent me some of the genera he

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regards as allied, and from these and his descriptions and figures I should judge that all belonged to the gerontogeic Calopteni, rather than to the Melanopli. It is at least pretty certain that they do not belong to Podisma.

Among the more interesting of the Acridiidæ obtained in Oregon in the summer of 1897 by Mr. A. P. Morse was an apterous species of Podisma, the apterous section of the genus having heretofore been known in America only from the extreme east. The table in my Revision (p. 97) may be thus recast, so far as the apterous species are concerned, to accommodate the new form:

TABLE OF THE APTEROUS NORTH AMERICAN SPECIES OF PODISMA.

a^1. Smaller species. Hind tibiae green or greenish; lower apical angle of male cerci angulate, but not decurved.

b^1. Hind femora conspicuously fasciate with fuscous; cerci very slender, in the middle distinctly less than half as broad as the base.
variegata Scudd.

b^2. Hind femora almost uniformly green; cerci relatively stout, in the middle distinctly more than half as broad as the base....*glacialis* Scudd.

a^2. Larger species. Hind tibiae yellowish (♂) or reddish (♀); lower apical angle of male cerci distinctly produced and decurved....*polita* sp. nov.

odisma polita sp. nov.

Plate VII., Figures 1, 2.

Dark olivaceous green, more or less flavous beneath (♂), or testaceo-olivaceous, so heavily flecked and punctate with fuscous as to appear griseous, pale testaceous beneath (♀), the sides with a broad, postocular, piceous band extending across the pronotum, enlarged upon the metazona and continued as a fuscous or piceous belt backward nearly to the end of the abdomen, at least in the male. Head olivaceo-testaceous, more or less heavily or lightly flecked with fuscous, heavily on summit, the postocular band edged narrowly above with testaceous; vertex slightly tumid, scarcely elevated above the pronotum, the interspace between the eyes twice (♂) or fully twice (♀) as broad as the first antennal joint; fastigium considerably declivent, scarcely arcuate, lying wholly below (♂) or at (♀) the upper level of the eyes, so as not to be wholly seen on a side view, slightly (♂) or scarcely (♀) sulcate, angularly expanded laterally in front; frontal costa percurrent, subequal, faintly expanded between the antennæ as seen from in front, a little (♂) or distinctly (♀) narrower than the

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interspace between the eyes, a little sulcate except, perhaps, above, sparsely biseriately punctate above; eyes rather small, prominent in the male, scarcely (♀) or fully (♂) as long as the infraocular portion of the genæ; antennæ testaceous, more or less infuscated apically and lutescent basally, often more or less rufous, about four-fifths (♂) or two-thirds (♀) as long as the hind femora. Pronotum enlarging slightly on the posterior half, especially in the female, the disk olivaceous (♂) or olivaceo-testaceous most heavily punctate with fuscous (♀), convex and passing insensibly into the vertical lateral lobes, which are pale flavo-testaceous below, the piceous stripe with a concave lower margin; median carina slight, percurrent, subequal; front and hind margins truncate; prozona feebly longitudinal (♂) or quadrate (♀), punctate anteriorly and posteriorly (♂) or equally throughout (♀), almost twice as long as the punctate metazona. Prosternal spine blunt, conical, short, especially in the female; interspace between mesosternal lobes a little transverse and nearly as broad as the lobes (♂) or almost twice as broad as long and fully as broad as the lobes (♀), the metasternal lobes subapproximate (♂) or nearly as distant as the mesosternal lobes (♀). Tegmina wanting. Fore and middle femora considerably tumid in the male, olivaceo-testaeeous, more or less infuscated; hind femora slender, testaceous (♀) or olivaceo-testaceous (♂) more or less infuscated in faint bifasciate clouds, beneath (and within at base) bright red, the geniculation blackish fuscous; hind tibiae luteous (♂) or reddish (♀), the spines black in the apical half, 9–10 in number in the outer series. Abdomen hardly (♂) or distinctly (♀) compressed, carinate, either dull olivaceo-testaceous, very heavily punctate with fuscous above, lighter below, the margins of the segments reddish (♀), or olivaceous, more or less infuscated above, flavo-olivaceous below, the sides more or less piceous except apically (♂); sides of the first segment with a distinct tympanum; the extremity in the male clavate, considerably recurved, the supraanal plate triangular with feebly acutangulate and in no way blunted apex, the margins a little elevated flaringly in the basal two-thirds, the median sulcus confined to the basal half, distinct, between well-rounded walls; furcula consisting of a pair of approximate, feebly divaricating, slender, hardly tapering, blunt, dark castaneous spines, extending over the supraanal plate by about twice the width of the last dorsal segment; cerci long and rather slender, erect, testaceous at base, becoming gradually infuscated apically, tapering in the basal half to about two-thirds the basal breadth, beyond equal as far

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as the slightly expanded tip, which is incurved and has the lower apical angle produced to an acutangulate apex, which is also slightly decurved, the whole almost as long as the supraanal plate; subgenital plate a little bullate, short and broad, the upper margins in the same plane, broadly rounded as seen from above, entire, the apical face with a bluntly conical, moderate, submarginal tubercle.

Length of body, ♂, 19.5 mm.; ♀, 23.5 mm.; antennæ, ♂, 9.25 mm.; ♀, 8 mm.; hind femora, ♂, 11.5 mm.; ♀, 12 mm.

19 ♂, 8 ♀. Divide (Cottage Grove) Lane Co., Oregon, Sept. 12, A. P. Morse.

This species is more nearly related to *P. glacialis* than to *P. variegata*, differing from the former most noticebly in the color of the hind femora and tibiæ, and in its relatively longer male cerci with their decurved tip.

MELANOPLUS Stål.

As already stated, all the new Melanopli that have been noted, with two exceptions, belong to this dominant genus. They will be brought under the several series to which they belong, and the tables for the determination of the species remodeled to introduce them. The number of species is now increased to upward of one hundred and fifty, thus surpassing all other North American genera of Orthoptera, but no new series are required to accommodate the additions, most of which are brachypterous.

FLABELLIFER Series.

A single Californian species is added to this series, its nearest neighbor being another Californian form, from which it may be separated by the following table of the short-winged species of this series, in modification of that given on pp. 124–125 of my Revision.

TABLE OF THE BRACHYPTEROUS SPECIES IN THE FLABELLIFER SERIES OF MELANOPLUS.

a^1. Tegmina about half as long as the abdomen and much longer than the pronotum..... .....*discolor* Scudd., *simplex* Scudd.*

a^2. Tegmina shorter than the pronotum.

b^1. Furcula of male only as long as the last dorsal segment; cerci in apical half equal and deeply sulcate longitudinally, so as to appear bent at right angles.....*rileyanus* McNeill.

b^2. Furcula of male one-fifth as long as supraanal plate; cerci in apical half tapering, not sulcate .....*blandus* sp. nov.

* For separation of these species, see original table.

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Melanoplus blandus sp. nov.

Plate VII., Figure 3.

Dark brownish testaceous above, luteo-testaceous beneath, with a moderately narrow, postocular, piceous stripe crossing the prozona and sometimes in a diluted form the metazona. Head rather prominent, testaceous, heavily flecked and dotted with fuscous, especially above, the postocular band edged with luteo-testaceous; vertex well rounded, a little elevated above the pronotum, the interspace between the eyes scarcely or not broader than the first antennal joint; fastigium strongly declivent, deeply sulcate; frontal costa failing to reach the clypeus, subequal, slightly broader than the interspace between the eyes, feebly sulcate, strongly punctate throughout, biseriately above; eyes rather large and rather prominent, fully half as long again as the infraocular portion of the genæ; antennæ luteo-castaneous, a trifle infuscated apically, about two-thirds as long as the hind femora. Pronotum subequal, dull testaceous more or less punctate with fuscous, the lower portion of the lateral lobes lutescent, the disk gently convex and passing by a rounded shoulder, a little more abrupt on the metazona than on the prozona, into the vertical, anteriorily tumid lateral lobes; front margin subtruncate, hind margin very obtusangulate, the angle sometimes rounded; median carina percurrent, most distinct on the metazona, least distinct between the sulci; prozona distinctly longitudinal, a fourth to a third longer than the distinctly punctate metazona. Prosternal spine small, distinctly conical, erect, bluntly pointed; interspace between mesosternal lobes about half as long again as broad, the metasternal lobes subattingent. Tegmina shorter than the pronotum, attingent, broadly ovate, apically rounded, but feebly angulate, blackish fuscous, excepting the anal area which is testaceous. Fore and middle femora feebly tumid, testaceous, more or less infuscated; hind femora testaceous, distinctly and obliquely bifasciate above with blackish fuscous, beneath rufescent, the geniculation infuscated; hind tibiae dull glaucous, often lutescent basally, with a fuscous annulation, the spines black except at base, 10-11 in number in the outer series. Extremity of abdomen a little clavate and upturned, the supraanal plate subtriangular with subrectangulate apex, the median sulcus percurrent, broad and bounded by rather high ridges on basal half, slender with slight margins on apical half; furcula consisting of a pair of slender, tapering, parallel, blunt-pointed

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fingers, extending over the basal fifth of the supraanal plate; cerci broad, laminate, torqueate, broadening on the basal third, where they are about two-thirds as broad as the hind femoral geniculation, then at once and regularly narrowing to half that width almost wholly by the excision of the lower margin, the apical portion strongly incurved, turned over the lip of the scoop formed by the subgenital plate, and twisted, but not abruptly, at right angles to the basal portion, the apex rounded, the upper margin nearly in one plane throughout but strongly arcuate; subgenital plate broad and nearly equal, especially where uniting with the lateral margins, the whole flaring faintly along the upper margin.

Length of body, 15 mm.; antennæ, 6 5 mm.; tegmina, 3 mm.; hind femora, 9.5 mm.

7 ♂. Summit of Mt. Wilson, Altadena, Los Angeles County, California, July 28, A. P. Morse.

This species is closely allied to *M. rileyanus*, found at lower levels in Los Angeles County, but differs from it in the longer furcula, and in the anal cerci, which are not equal in the apical half nor externally sulcate, so as to appear longitudinally bent at right angles, as in *M. rileyanus*.

Bowditchi Series.

Prof. C. F. Baker has sent me from Colorado a single specimen of a species of this series, which differs clearly from the others in the elevation and notching of the apical margin of the subgenital plate in the male. In order to bring it next its nearest ally, *M. bowditchi*, the table for the determination of the species in this series, as given in my Revision (p. 131), needs to be slightly remodelled, as follows:

TABLE OF THE SPECIES IN THE BOWDITCHI SERIES OF MELANOPLUS.

a^1. Subgenital plate of male distinctly elevated apically above the lateral margins, and notched..... *incisus* sp. nov.

a^2. Subgenital plate of male not or hardly elevated apically above the lateral margins, and entire.

b^1. Body, tegmina and legs brown or testaceous, the hind femora generally banded with dark colors.

c^1. Forks of the male furcula more or less obliquely or transversely truncate at tip and given an oppositely hooked appearance by the rounded excision of the inner margin; hind femora generally distinctly banded.

d^1. Rather uniform in coloring, the lateral lobes with no bright

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stripe; male cerci in no way expanded apically, and externally tumid rather than sulcate.

c^1. Lateral lobes of prozona with a broad and usually distinct piceous band above; tegmina generally distinctly flecked along the middle line ..... *bowditchi* Scudd.

c^2. Lateral lobes of prozona with a narrow or no distinct band above; tegmina very obscurely flecked, if at all, along the middle line ..... *flavidus* Scudd.

d_2. Highly variegated, the lateral lobes of pronotum conspicuously marked with an unequal bright flavous stripe next the lateral carinæ; male cerci very feebly expanded and externally sulcate apically.

pictus Brun.

c_2. Forks of the male furcula rounded symmetrically at tip, the inner margin scarcely more excised than the outer, so that the forks are straight and not oppositely hooked; bands of hind femora scarcely perceptible ..... *elongatus* Scudd.

b^2. Body, tegmina and legs almost wholly green, the hind femora not banded.

c^1. Disk of pronotum and summit of head uniform in coloration, the former passing into the lateral lobes with a more distinct angle than in the alternate category; hind tibiæ blue; antennæ uniform.

flavescens Scudd.

c^2. Sides of the disk of the prozona with a distinct narrow yellow stripe, extending to the upper margin of the eyes; passage of the disk of the pronotum into the lateral lobes more gradual than in the alternate category; hind tibiæ green; antennæ apically infuscated.

herbaceus Brun.

Melanoplus incisus sp. nov.

Of pretty large size, fuscous marked with flavous, the darkest parts being a broad postocular stripe which extends to but not upon the metazona and a slightly narrower glistening stripe at the outer margin of the disk of the pronotum; beneath it is almost wholly flavous. Head more or less infuscated throughout, but especially above, though there is a dull flavous median vertical streak, and the upper margins of the postocular band are bordered with the same; vertex gently tumid, the interspace between the eyes about equalling the width of the frontal costa, the fastigium broadly and rather deeply sulcate; frontal costa moderate in breadth, subequal but a little narrowed above the ocellus, biseriately punctate above; eyes rather large and rather prominent; antennæ almost as long as the hind femora, fusco-flavous. Pronotum subequal, feebly enlarging at the metazona, the front margin truncate, the hind margin very obtusely angulate, the

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angle rounded, the disk gently convex on the prozona with no lateral carinæ, on the metazona plane with obscure rounded lateral carinæ; median carina slight though distinct and infuscated on the metazona, and less so on the front portion of the prozona; prozona barely longitudinal, smooth, but slightly longer than the feebly and rather sparsely punctate metazona. Prosternal spine moderate, compressed conical, blunt; interspace between mesosternal lobes narrow, at least four times as long as broad, but gradually broadening in posterior half, the metasternal lobes attingent over a long space. Tegmina slender, gently tapering throughout, apically rounded, surpassing a little the hind femora, pale fuscous, immaculate; wings pellucid, with a scarcely perceptible flavous tinge, the posterior veins pale glaucous. Fore and middle femora testaceous; hind femora fuscous on the outer face, tinged apically with blue, elsewhere flavous or orange flavous twice barred above with fuscous, the genicular lobes pallid with a basal fuscous spot, the genicular arc heavily infuscated; hind tibiæ dark glaucous, pallescent at extreme base, the spines pale glaucous with blackish fuscous tips, 10-11 in number in the outer series. Extremity of abdomen feebly clavate, upturned, the supraanal plate obscurely clypeate, the lateral and apical margins a little and broadly raised, the median sulcus obsolete; furcula consisting of a pair of strongly flattened, straight, parallel plates, broad and attingent in basal half, each suddenly narrowing to half its former width by the rounded excision of its inner margin, the apex broadly rounded and reaching beyond the middle of the underlying plate; cerci rather small, tapering to a little more than half their extreme width in the basal half, when each is bent slightly inward, thereafter continues equal to the blunt and rounded tip, which fails considerably to reach the tip of the supraanal plate; subgenital plate forming a well-rounded scoop, the apical margin of which is distinctly elevated and bluntly notched, and notwithstanding this elevation considerably narrower apically than at base.

Length of body, 25 mm.; antennæ, *c.* 13 mm.; tegmina, 22 mm.; hind femora, 14.5 mm.

1 ♂. Fort Collins, Larimer County, Colorado, August 11, C. F. Baker.

This species is separable from all others of the Bowditchi series by the elevation of the apical margin of the subgenital plate of the male; it bears the closest general resemblance to *M. bowditchi*.

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INDIGENS SERIES.

I am inclined to place here an interesting species* sent to me by Dr. Hancock from the mountains of Arizona, although it differs considerably from the single species formerly placed here and will require some modification of the characters given to the series in my former table (Revision, p. 125), and in the text (p. 210), in that the anal cerci, though broad and long and subequal, do narrow considerably in the basal half, and in the middle are distinctly narrower than the frontal costa, and are incurved and apically angulate, while the apical margin of the subgenital plate is not elevated to a blunt tubercle; furthermore its abdomen is distinctly clavate at tip and the supraanal plate does not have the lateral margins mesially notched. The points of distinction between the two species may be tabulated thus:

TABLE OF THE SPECIES IN THE INDIGENS SERIES OF MELANOPLUS.

a^1. Tegmina slightly distant (♂); abdomen of male hardly clavate at apex; supraanal plate with lateral margins mesially notched; cerci straight, scarcely tapering in basal half, broader than the frontal costa, apically rounded or subangulate; subgenital plate considerably elevated apically into a slight rounded tubercle..... *indigens* Scudd.

a^2. Tegmina attingent (♂) or subattingent (♀); abdomen of male distinctly clavate; lateral margins of supraanal plate entire; cerci incurved, tapering distinctly in basal half, narrower than the frontal costa, apically produced and angulate; subgenital plate with the apical and lateral margins in the same plane, without tubercle ..... *femur-nigrum* sp. nov.

MELANOPLUS FEMUR-NIGRUM sp. nov.

Plate VII., Figure 4.

About or rather below the medium size, dark fuscous above, pale flavous beneath and with pale flavous markings, conspicuous in a stripe following the lower margin of the outer face of the hind femora, and an oblique metapleural stripe. Head not prominent, plumbeo-testaceous infuscated above, the vertex gently convex, slightly elevated above the pronotum, the interspace between the eyes fully as wide as (♂) or considerably wider than (♀) the first antennal joint; fastigium steeply declivent, distinctly sulcate, at least in the male; frontal costa sub-

* I am not able at the moment to compare this directly with the species on which the series was founded.

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equal, almost percurrent, about as wide as the interspace between the eyes, sulcate throughout (♂) or below the ocellus (♀), biseriately and irregularly punctate throughout; eyes not very large nor very prominent, but distinctly longer than the infraocular portion of the genæ; antennæ varying from luteous to castaneous, more or less infuscated apically, about as long (♂) as the hind femora. Pronotum fuscous, with a broad, piceous, postocular band on the prozona (below which the lateral lobes, at least on the prozona, approach the color of the under surface, and next which the disk is feebly pallescent), enlarging feebly and regularly from in front backward, especially in the female; disk feebly convex, passing by a feeble angulation into the subvertical lateral lobes; median carina percurrent, but feebler though uniform on the prozona; front margin truncate, hind margin feebly and roundly angulate; prozona a little longitudinal (♂) or longitudinally subquadrate (♀), nearly a third longer than the finely and obscurely punctate metazona. Prosternal spine short, erect, very blunt conico-cylindrical; interspace between mesosternal lobes subquadrate (♂) or distinctly transverse (♀), the metasternal lobes approximate (♂) or rather distant (♀). Tegmina abbreviate, a little shorter than the pronotum, ovate, less than twice as long as broad, attingent (♂) or subattingent (♀), dark fuscous or blackish fuscous, the apex rounded angulate. Fore and middle femora somewhat tumid in the male; hind femora blackish fuscous above, the outer face nearly black, with the stripe mentioned, pale orange beneath with a pale, pregenicular semi-annulus on the inner side; hind tibiæ blue, the spines black, 10-11 in number in the outer series. Abdomen pale flavous, a little infuscated above and the sides piceous basally, the extremity in the male considerably clavate and considerably recurved, the supraanal plate broad hastate, nearly plane, with acutangulate apex and shallow, rather broad, percurrent median sulcus, margined by low blunt walls; furcula consisting of a pair of slight dentiform projections, slightly divaricating and extending beyond the last dorsal segment by less than its length; cerci moderately stout laminæ, tapering gently in the basal half and straight, then equal for a short distance and slightly incurved, and then tapering rapidly and curving strongly inward to a terminal hook which just fails to reach the tip of the supraanal plate; subgenital plate small, flaring a little, of equal breadth and almost as long as its apical breadth, the lateral and apical margins in the same plane, a little angulated where they meet.

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Length of body, ♂, 15.5 mm., ♀, 19.5 mm.; antennæ, ♂, 9 mm., ♀, 8 mm.; tegmina, ♂ ♀, 4.25 mm.; hind femora, ♂, 9.75 mm.

13 ♂, 1 ♀. San Francisco Mts. near Flagstaff, Coconino Co., Arizona, July 30, Dr. J. L. Hancock.

MANCUS SERIES.

The number of species belonging here has been nearly doubled by the discoveries of the past year, compelling a complete remodelling of the table (Revision, pp. 125-126) of the species of this series. More than one of the species have the apical margin of the subgenital plate slightly elevated, so that characters drawn from this part will not serve to distinguish it from the Indigens Series, particularly if we are to add to that series the species just described, without apical elevation to its plate.

TABLE OF THE SPECIES IN THE MANCUS SERIES OF MELANOPLUS.

*a*¹. Prozona, at least in male, much longer than broad, the disk of the whole pronotum distinctly more than twice as long as middle breadth; interspace between mesosternal lobes of male twice or almost twice as long as broad.

*b*¹. Antennæ of male about two-thirds as long as hind femora; hind margin of pronotum subtruncate or almost subtruncate; cerci of male more or less twisted as well as incurved.

*c*¹. Hind tibiæ blue; furcula of male prominent; cerci considerably torqueate, deeply sulcate exteriorly in apical half, which is but little narrower than the basal half, and not bent upward; apical margin of subgenital plate slighly elevated, well rounded as seen from above *varicus* sp. nov.

*c*². Hind tibiæ red; furcula of male slight; cerci only slightly torqueate and shallowly sulcate, the apical half much narrower than the basal, and bent upward; apical margin of subgenital plate not elevated, angulate as seen from above ..... *immunis* sp. nov.

*b*². Antennæ of male five-sixths as long as hind femora; hind margin of pronotum distinctly obtusangulate; cerci of male throughout in nearly one obliquely vertical plane, though incurved ..... *scudderi* Uhler

*a*². Prozona, even in male, transverse, subquadrate or slightly longitudinal, the disk of the whole pronotum less than twice as long as middle breadth; interspace between mesosternal lobes of male not or scarcely more than half as long again as broad.

*b*¹. Male cerci of subequal width, the apical being scarcely narrower than the basal half.

*c*¹. Male abdomen strongly recurved; forks of furcula divergent, dis-

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tinctly longer than the last dorsal segment; subgenital plate with no apical tubercle.....*gillettei* Scudd.

c^2. Male abdomen scarcely recurved; forks of furcula parallel, minute, hardly as long as the last dorsal segment; subgenital plate with a slight apical tubercle.....*artemisiæ* Brun.

b^2. Male cerci of distinctly unequal width.

c^1. Male cerci tapering only in basal half, the apical half subequal, apically rounded; furcula distinct though slight.

d_1. Pronotum subtruncate posteriorly; tegmina shorter than the pronotum, broadly rounded or subangulate at apex; male cerci long and rather slender, nearly straight as seen laterally...*mancus* Smith.

d^2. Pronotum obtusangulate posteriorly; tegmina as long as or longer than the pronotum, apically acuminate; male cerci short and not very slender, rather strongly bent-arcuate as seen laterally.

e^1. Tegmina of male considerably longer than pronotum; furcula considerably longer than the last dorsal segment; apical margin of subgenital plate slightly elevated, well rounded, in no way tuberculate .....*acutus* sp. nov.

e^2. Tegmina of male scarcely if at all longer than pronotum; furcula no longer than last dorsal segment; apical margin of subgenital plate feebly elevated to a slight tubercle.....*cancri* Scudd.

c^2. Male cerci nearly equal in basal half, tapering regularly in the apical half, apically acuminate; furcula subobsolete.....*usitatus* sp. nov.

Melanoplus varicus sp. nov.

Plate VII., Figures 5, 6.

Of small size, fusco-testaceous above, pallid testaceous beneath, with a broad piceous or subpiceous postocular band crossing the head and prozona. Head not prominent, or but slightly so, pallid testaceous, more or less flecked with fuscous, especially above, the postocular band distinctly margined above and generally below with flavo-testaceous; vertex tumid, elevated distinctly above the pronotum, the interspace between the eyes fully as broad as (♂) or half as broad again as (♀) the first antennal joint; fastigium steeply declivent, sulcate; frontal costa subequal, just failing to reach the clypeus, fully as broad as the interspace between the eyes, faintly sulcate below the ocellus, irregularly punctate above; eyes moderately large and rather prominent, much longer than the infraocular portion of the genæ; antennæ testaceous, apically slightly infuscated, fully two-thirds (♂) or less than one-half (♀) as long as the hind femora. Pronotum subequal but faintly expanding on the metazona, fusco-testaceous or pale

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testaceous flecked with fuscous on the disk, which is broadly convex, passing by a rounded but still distinct shoulder into the lateral lobes, where each half of the prozona but especially the anterior half is feebly and independently tumid; median carina distinct and percurrent, more distinct on the metazona, sometimes obsolescent between the sulci; front margin faintly convex, hind margin feebly angulate; prozona longitudinal, about a third as long again as the more distinctly and more finely punctate metazona. Prosternal spine short, erect, blunt conical; interspace between mesosternal lobes nearly three times as long as broad (♂) or quadrate (♀), the metasternal lobes subattingent (♂) or approximate (♀). Tegmina abbreviate, a little shorter than the pronotum, attingent, broad ovate, apically subangulate, fusco-testaceous, pale testaceous in the anal field, which is thus slightly contrasted. Fore and middle femora feebly tumid in the male; hind femora moderately slender, testaceous, broadly and obliquely bifasciate with fuscous, sometimes blended on the outer face, ferruginous beneath, the geniculation fuscous; hind tibiæ blue, often more or less testaceous at base, with a narrow black postgenicular annulus, the spines black, 10-11 in number in the outer series. Abdomen testaceous, subflavous beneath, the sides more or less piceous, the extremity in the male a little clavate, slightly recurved, the supraanal plate triangular with scarcely elevated margins, the median sulcus moderately coarse, percurrent, between distinct walls considerably elevated basally; furcula consisting of a pair of flattened, tapering, acuminate fingers, diverging at right angles and nearly a third as long as the supraanal plate; cerci forming moderately broad, gently tapering, compressed laminæ, less than three times as long as middle breadth, two-thirds as broad apically as basally, the apex broadly convex and the apical half gently incurved and externally rather deeply sulcate; subgenital plate small, of nearly equal length and breadth, the apical margin slightly elevated, thickened and entire.

Length of body, ♂, 16.5 mm., ♀, 20 mm.; antennæ, ♂, 6.25 mm., ♀, 6 mm.; tegmina, ♂, 3.25 mm., ♀, 5 mm.; hind femora, ♂, 9 mm., ♀, 11 mm.

14 ♂, 6 ♀. Tehachapi, Kern Co., California, August 2, A. P. Morse.

This species is very distinct from any other by the considerable twist and deep sulcation of the male cerci.

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Melanoplus immunis sp. nov.

Of small size and moderately slender, very dark fuscous, ferrugineo-testaceous beneath, with a broad postocular piceous band reaching across the prozona. Head not at all prominent, ferrugineo-testaceous, much infuscated above, the postocular band narrowly edged above with testaceous or ferruginous, at least in the female; vertex gently tumid, feebly elevated above the pronotum, the interspace between the eyes nearly twice as wide as the first antennal joint, especially in the female; fastigium rather steeply declivent, broadly and shallowly sulcate; frontal costa almost or quite percurrent, subequal but faintly narrowed above, somewhat narrower than the interspace between the eyes, feebly sulcate or depressed at the ocellus, biseriately punctate above; eyes moderate, scarcely more prominent in the male than in the female, a little longer than the infraocular portion of the genæ; antennæ fusco-rufous, about two-thirds (♂) or three-fifths (♀) as long as the hind femora. Pronotum subequal but expanding a little on the metazona, dark fuscous, ferrugineo-testaceous below the postocular band, the disk gently convex and passing by a more or less distinct angulation, forming tolerably well pronounced lateral carinæ in the male, into the vertical lateral lobes; median carina feeble on the prozona, distinct on the metazona; front and hind margins subtruncate; prozona slightly longitudinal (♂) or quadrate (♀), a half longer than the obscurely punctate metazona. Prosternal spine rather large, erect, subconical (♂) or appressed cylindrical (♀), blunt; interspace between mesosternal lobes quadrate or a little transverse (♂) or distinctly transverse (♀), the metasternal lobes subattingent (♂) or rather distant (♀). Tegmina nearly (♂) or about (♀) as long as the pronotum, attingent, obovate, apically rounded, less than twice as long as broad, fuscous. Fore and middle femora slightly tumid in the male, ferruginous, more or less infuscated; hind femora slender, ferrugineo-testaceous, more or less heavily tinged above with fuscous, beneath flavescent; hind tibiæ dull pale ferruginous, more or less lutescent, the spines almost wholly black, 10 (♂) or 11 (♀) in number in the outer series. Extremity of male abdomen clavate, a little recurved, the supraanal plate simple, triangular, a little acutangulate, pointed, the surface nearly plane but feebly tectate with a deep median sulcus in the basal half; furcula consisting of a pair of slender parallel thorns projecting over the supraanal plate on either side of the median sulcus by no more than the length of the last dorsal segment; cerci

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lamellate and rather small, as broad at base as the narrowest part of the frontal costa, narrowing but feebly and straight in the basal half, beyond bent a little upward, incurved, and tapering more distinctly to a bluntly angulate tip, and at the same time faintly torqueate and externally sulcate, the lower margin of the apical half straight, the whole falling considerably short of the tip of the supraanal plate; subgenital plate not very large, as a whole forming a pyramidal tubercle, almost as broad apically as long, the margins meeting angularly at the apex of the pyramid.

Length of body, ♂, 16 mm., ♀, 18 mm.; antennæ, ♂, 6.25? mm., ♀, 6 mm.; tegmina, ♂, 3 5 mm., ♀, 4 mm.; hind femora, ♂, 9.5 mm., ♀, 10.5 mm.

2 ♂, 1 ♀. Mary's Peak, Benton Co., Oregon, Sept, 16, A. P. Morse.

This species is most nearly allied to *M. scudderi* of the east, differing from it in the shorter antennæ and tegmina, the posteriorly subtruncate pronotum, the more curved and slightly torqueate male cerci, and the acutely pyramidal subgenital plate.

Melanoplus acutus sp. nov.

Of small size, fusco-testaceous, flavous beneath, with a very broad fusco-piceous postocular band, at least in the male, crossing the prozona. Head not prominent, flavous or plumbeo-olivaceous, fusco-testaceous above; vertex gently tumid, scarcely elevated above the pronotum, the interspace between the eyes about half as broad again (♂) or nearly twice as broad (♀) as the basal joint of the antennæ; fastigium steeply declivent, considerably (♂) or slightly (♀) sulcate; frontal costa failing to reach the clypeus, subequal, fully as broad as the interspace between the eyes, depressed at the ocellus, biseriately punctate above; eyes moderate, very little prominent in the male, much longer than the infraocular portion of the genæ; antennæ rufous, in the female two-thirds as long as the hind femora. Pronotum subequal, fusco-testaceous, pallid below the postocular band, the disk gently convex, passing by a distinct though well rounded shoulder into the vertical lateral lobes, which are tumid on the prozona; median carina distinct, percurrent, and either equal (♀) or subdued between the sulci (♂); front margin gently convex, in the male faintly and mesially emarginate, hind margin very broadly obtusangulate, the angle sometimes rounded; prozona longitudinally quadrate (♂) or

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quadrate (♀), a half longer than the finely punctate metazona. Prosternal spine erect, cylindroconical, very blunt; interspace between mesosternal lobes fully half as long again as broad (♂) or scarcely longer than broad (♀), the metasternal lobes attingent (♂) or approximate (♀). Tegmina slightly longer than the pronotum, overlapping, apically acuminate, fusco-testaceous. Fore and middle femora somewhat tumid in the male, testaceous or fusco-testaceous; hind femora testaceous or flavo-testaceous, more or less obscurely bifasciate with fuscous, the inner and lower faces flavous, the geniculation infuscated; hind tibiæ red. the spines black in the apical half, 11-12, generally 11, in number in the outer series. Extremity of male abdomen clavate and considerably recurved, the supraanal plate triangular with acutangulate apex, the lateral margins thickened and elevated, especially in the basal half, the median sulcus rather broad and subequal, extending over the basal two-thirds; furcula consisting of a distinct fork, the arms forming a U, flattened, tapering, parallel and acuminate, crossing the basal third of the supraanal plate; cerci rather small, curved upward and scarcely inward, each formed of a compressed lamina, which tapers rapidly in the basal half to less than half the basal width, the apical half equal, apically rounded, outwardly feebly sulcate or rather dimpled; subgenital plate rather small, subconical, of equal length and width, the apical margin strongly rounded as seen from above, feebly elevated and entire.

Length of body, ♂, 14 mm, ♀, 18 mm.; antennæ, ♀, 6 mm.; tegmina, ♂, 4.5 mm., ♀, 5 mm.; hind femora, ♂♀, 9 mm.

2 ♂, 1 ♀. Brown's Valley, Traverse Co., Minnesota, Oct. 26, O. Lugger.

This species is closely allied to the geographically distant *M. cancri* of Cape St. Lucas, differing from it in the greater length of the tegmina and furcula, and in the form of the subgenital plate; other distinctions would doubtless appear if we possessed fresher specimens of the southern species.

Melanoplus usitatus sp. nov.

Of about medium size, fuscous, the male with a decided plumbeous tinge, dull flavous beneath. Head not prominent, dull olivaceous or pale testaceous, more or less heavily flecked with fuscous, especially in the female, fuscous above, with a broad postocular piceous band, sometimes edged above with pale testaceous; vertex gently convex, scarcely

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elevated above the pronotum, the interspace between the eyes broad, twice (♂) or more than twice (♀) as broad as the first antennal joint; fastigium moderately declivent, hardly sulcate; frontal costa subequal, fading before the clypeus, a little narrower than the interspace between the eyes, depressed at the ocellus, irregularly punctate throughout; eyes moderate, a little prominent in the male, a little longer than the infraocular portion of the genæ; antennæ castaneous, luteous at extreme base (broken in the only specimens seen). Pronotum subequal (♂) or distinctly and steadily enlarging posteriorly (♀), fuscous, with a very broad postocular piceous band on the prozona, below which the lateral lobes are pale testaceous, the disk transversely convex, and on the prozona slightly tumid, at least in the male, passing by tolerably distinct but blunt lateral carinæ into the slightly tumid subvertical lateral lobes; median carina distinct, equal, percurrent (♂) or obscure, subobsolete between the sulci (♀); front and hind margins subtruncate; prozona distinctly longitudinal (♂) or subquadrate (♀), fully (♂) or less than (♀) a half longer than the scarcely punctate metazona. Prosternal spine rather short and stout, appressed, rounded conical, very blunt; interspace between mesosternal lobes nearly twice as long as broad (♂) or transverse, as broad as the lobes (♀), the metasternal lobes approximate (♂) or rather distant (♀). Tegmina nearly or quite as long as the pronotum, subattingent, at least in the male, subovate, nearly twice as long as broad, apically acuminate or subacuminate, fusco-testaceous. Fore and middle femora somewhat tumid in the male, flavous or testaceous, infuscated above (hind legs lost in specimens seen). Abdomen strongly carinate, the sides strongly infuscated, the extremity in the male a little clavate, slightly recurved, the supraanal plate triangular, the tip slightly acutangulate, the surface nearly plane, with a very shallow, regularly narrowing, percurrent median sulcus between slight walls; furcula consisting of very slight, depressed, a little divergent, triangular denticles; cerci rather coarse, subtriangular, about half as long again as basal breadth, the lower margin straight, the upper sinuous, the apex blunt acuminate and feebly incurved, the lower half of the apical half faintly sulcate externally; subgenital plate rather small, subpyramidal, of equal breadth throughout, slightly flaring and apically compressed to form a pyramidal tubercle.

Length of body, ♂, 20 mm., ♀, 21.5 mm.; tegmina, ♂, 5 mm., ♀, 6 mm.

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1♂, 1♀. Corvallis, Benton Co., Oregon, May 23, June 9, A. B. Cordley (A. P. Morse).

Its peculiar cerci make the species an aberrant member of its series.

Borckii Series.

The species described since the publication of my Revision, together with those here made known, double the number of forms belonging to this series and this necessitates a new arrangement of the material, though without much disturbance of the former table, since most of the species follow at the end of the previous list. They may be separated as follows:

TABLE OF THE SPECIES IN THE BORCKII SERIES OF MELANOPLUS.

a^1. Subgenital plate of male more or less elevated posteriorly, with high basal margins, but with no distinct apical tubercle.

b^1. Posterior margin of pronotum not mesially emarginate; tegmina attingent or approximate.

c^1. Attenuated portion of male cerci hardly more than half as long as basal expanded tapering portion.

d^1. Interspace between mesosternal lobes of female strongly transverse; lateral carinæ of pronotum rounded so as to be subobsolete; postocular piceous band generally distinct, complete, percurrent. *pacificus* Scudd.

d^2. Interspace between mesosternal lobes of female subquadrate or feebly transverse; lateral carinæ of pronotum distinct; postocular piceous band generally obsolete or wholly wanting, and, even when distinct, wholly confined to the prozona..... ....*borckii* Stål.

c_2. Attenuated portion of male cerci nearly or quite as long as expanded basal portion.....*pinctus* sp. nov.

b^2. Posterior margin of pronotum mesially emarginate; tegmina distant, lateral.

c^1. Color testaceous with feeble or no postocular dark belt. *tenuipennis* McNeill.

c^2. Color dark fuscous with distinct and broad postocular band, at least in the male.....*missionum* Scudd.

a_2. Subgenital plate of male distinctly tuberculate at tip, the basal margin not greatly elevated.

b^1. Tegmina distinctly shorter than the pronotum, short ovate, attingent or approximate, rarely distant, apically well rounded.

c^1. Hind tibiæ blue; male cerci distinctly arcuate or sinuate.

d^1. Tegmina more or less widely separated, rarely attingent; inter-

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space between mesosternal lobes of male twice or nearly twice as long again as broad; cerci not finely acuminate at tip.

fuscipes McNeill

d^2. Tegmina attingent; interspace between mesosternal lobes of male only slightly longer than broad; cerci tapering, rather regular, subfalcate, finely acuminate at tip..... *scitulus* Scudd.

c^2. Hind tibiæ red; male cerci very simple and straight, hardly incurved.

d^1. Slender forms. Male cerci equal and very slender in distal third or more, about one-third as broad as the extreme base.

islandicus Blatchl.

d^2. Stouter forms. Male cerci very stout and broad, tapering throughout apical half and very bluntly rounded at apex.

truncatus sp. nov.

b^2. Tegmina longer than the pronotum, elongate, overlapping or attingent, apically acuminate.

c^1. Slender forms. Pronotum feebly angulate behind, the median carina percurrent, subequal; tegmina attingent, in one plane, no longer or scarcely longer than the pronotum; hind tibiæ green; interspace between mesosternal lobes of male twice as long as broad.

phœtaliotiformis sp. nov.

c^2. Stouter forms. Pronotum distinctly angulate behind, the median carina subobsolete between the sulci; tegmina overlapping, in two planes, one represented by the anal area, the other by the remainder, fully as long as, generally much longer than, the pronotum; interspace between mesosternal lobes of male quadrate or subquadrate.

d. Male pronotum scarcely expanded on the metazona; tegmina but little longer than the pronotum; apical half of male cerci very slender, slenderer than the antennæ..... *incultus* sp. nov.

d. Male pronotum considerably expanded on the metazona; tegmina fully half as long again as the pronotum; apical half of male cerci relatively stout, as large as the antennæ ..... *huroni* Blatchl.

Melanoplus pinctus sp. nov.

Plate VII., Figure 7.

Rather small, the female often considerably the larger, testaceous much marked with fuscous, dull flavous beneath. Head slightly prominent, at least in the male, flavo-testaceous, much and delicately mottled with pale fuscous, or above with darker fuscous, with a dark fuscous postocular stripe; vertex gently convex, faintly elevated above the pronotum, the interspace between the eyes as broad (♂) or nearly twice as broad (♀) as the first antennal joint; fastigium steeply

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declivent, distinctly (♂) or scarcely (♀) sulcate; frontal costa fading far before the clypeus, subequal, fully as wide as the interspace between the eyes, depressed at the ocellus, punctate throughout; eyes, especially in the male, rather large and somewhat prominent, very much longer than the infraocular portion of the genæ; antennæ luteo-testaceous, sometimes castaneous, luteous toward the base, in both sexes about half as long as the hind femora. Pronotum subequal, short, in the female expanding a little on the metazona, the disk varying from fusco-testaceous to dark fuscous, edged laterally with pale testaceous, at least on the prozona, the lateral lobes with a more or less distinct, glistening fuscous, postocular band on the prozona, on the metazona becoming plain fuscous, sometimes in the female tinged with ferruginous, the lobes below pallid testaceous more or less dotted with fuscous or infuscated, and narrowly edged throughout with pallid testaceous; disk nearly plane, passing by a rounded shoulder, in the female forming faint blunt lateral carinæ, into the subvertical lateral lobes; median carina moderately distinct and coarse, subobsolete between the sulci; front and hind margins almost truncate; prozona feebly arched longitudinally, longitudinal, about a fourth or a fifth (♂) or a third (♀) longer than the rather heavily punctate metazona. Prosternal spine rather small, erect, conical, not very bluntly acuminate; interspace between mesosternal lobes more than twice (♂) or less than half (♀) as long again as broad, the metasternal lobes attingent (♂) or approximate (♀). Pleura piceous or fuscous with a pale flavous oblique stripe. Tegmina a little shorter than the pronotum, attingent or slightly overlapping, broad ovate, hardly angulate apically, much less than twice as long as broad, fusco-testaceous. Fore and middle femora somewhat tumid in the male, pale olivaceo-testaceous flecked with fuscous; hind femora rather slender, pale testaceous, confusedly trifasciate externally with blackish fuscous, pale orange beneath, the genicular arc fuscous; hind tibiæ blue, a little paler next the base and along the spiniferous margins (or at least the external one), the spines pallid on basal, fuscous on apical half, 9-10 in number in the outer series. Abdomen strongly carinate, pale testaceous, flavescent beneath, the sides more or less belted with piceous, the extremity in the male clavate, a little upturned, the supraanal plate triangular, acutangulate, nearly plane except for the somewhat prominent and sharp ridges which bound the percurrent median sulcus, and which suddenly divaricate basally; furcula consisting of a pair of hardly

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noticeable attingent projections of the last dorsal segment; cerci tumid obpyriform, consisting of an ovate tapering basal bulb and an apical, scarcely tapering, blunt finger of equal length, the latter gently incurved and just failing to reach the tip of the supraanal plate; subgenital plate narrow and rather small, the lateral margin of each side elevated basally to twice the normal height to form a rounded lobe, and the apical margin elevated to form a lesser blunt triangular lobe as seen from behind.

Length of body, ♂, 15.5 mm., ♀, 21 mm.; antennæ, ♂, 5.5 mm. ♀, 7.5 mm.; tegmina, ♂, 4.25 mm., ♀, 5 mm.; hind femora, ♂, 10.5 mm., ♀, 14 mm.

7 ♂, 7 ♀. San Diego, July 22; Point Loma, July 23; and Coronado, San Diego Co., California, July 24, A. P. Morse.

This species is nearest the larger *M. borckii* and *M. pacificus*, differing mainly in the longer apical finger of the male cerci.

Melanoplus islandicus.

Melanoplus islandicus Blatchl.! Psyche, VIII., 196–197 (1898).

Melanoplus abortivus Walk.! Can. Ent., XXX., 90–92 (1898).

Described by Blatchley from Les Cheneaux Islands, Michigan, and by Walker from DeGrassi Point, Lake Simcoe, Ontario, and Aurora in the same province. Blatchley referred it to the Puer Series on my statement, but I was in error in supposing the cerci to be styliform and not to taper irregularly as they do. I introduce the species here to indicate its place in the series.

Melanoplus truncatus sp. nov.

Plate VII., Figure 8.

Of medium size or slightly below it, dark fuscous above, flavo-testaceous below, with a very broad piceous postocular band, which crosses the whole pronotum, but is sometimes diluted on the metazona, and with conspicuous pale flavous stripes on the metapleura and along the lower margin of the outer face of the hind femora. Head hardly prominent, plumbeo-olivaceous, varying to testaceous, more or less infuscated, at least above, and with the postocular stripe edged narrowly with dull flavous; vertex gently convex, only slightly elevated above the pronotum, the interspace between the eyes considerably broader than the first antennal joint; fastigium steeply declivent, dis-

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tinctly sulcate, especially in the male; frontal costa about or hardly as wide as the interspace between the eyes, subequal, just not reaching the clypeus, faintly (♂) or distinctly (♀) sulcate below the ocellus, biseriately punctate above; eyes moderate, but little more prominent in the male than in the female, distinctly longer than the infraocular portion of the genæ; antennæ castaneous or rufous, infuscated apically, in the male about two-thirds as long as the hind femora. Pronotum rather short, faintly (♂) or distinctly (♀) enlarging from in front backward, dark fuscous above, the lower portion of the lateral lobes luteo- or olivaceo-testaceous, the disk convex, and passing, by a distinct angulated shoulder forming weak lateral carinæ, into the vertical, anteriorly tumid (♂) or subvertical (♀) lateral lobes; median carina prominent, equal, percurrent; front margin subtruncate, in the male feebly flaring, hind margin subtruncate, faintly rounded, sometimes with the faintest possible median emargination; prozona feebly longitudinal (♂) or longitudinally subquadrate (♀), fully a third longer than the finely punctate metazona. Prosternal spine moderate, conical, blunt, suberect; interspace between mesosternal lobes quadrate or longitudinally quadrate (♂) or somewhat transverse (♀), the mesosternal lobes subattingent (♂) or rather distant (♀). Tegmina a little shorter than the pronotum, separated above, elliptical, apically rounded, dark fuscous. Fore and middle femora a little tumid in the male, testaceous, more or less infuscated; hind femora rather short and thick, blackish fuscous above, the outer face black with the inferior flavous stripe already mentioned and the upper edge reddish flavous, the under surface orange and the geniculation fuscous; hind tibiæ dull or bright red, rarely luteous, the spines black almost to the base, 11-12 in number in the outer series. Extremity of male abdomen very clavate, strongly recurved, the supraanal plate subhastate with gently elevated margins, and a deep percurrent or almost percurrent median sulcus with high margins; furcula consisting of a pair of slender, tapering, parallel fingers extended over the basal fifth of the supraanal plate; cerci simple subtriangular laminæ, largest just beyond the extreme base, in one vertical plane, the upper edge nearly straight or feebly concave, the lower edge bent rounded, the apex bluntly rounded and hardly half the basal width, the whole less than twice as long as the greatest width; subgenital plate broad and broadest at base though subequal and much longer than broad, the apical margin feebly elevated and faintly tuberculate.

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Length of body, ♂, 17.5 mm., ♀, 21.5 mm.; antennæ, ♂, 7.5? mm., ♀, 7.5 mm.; tegmina, ♂ ♀, 4.25 mm.; hind femora, ♂, 11 mm.

6 ♂, 1 ♀. San Francisco Mts., Flagstaff, Coconino Co., Arizona, July 31, Dr. J. L. Hancock.

This is an aberrant member of the series, bearing no close resemblance to any other species, excepting that in the unusual and striking markings of the hind femora it almost exactly repeats those of *M. femur-nigrum*, found in the same place at the same time. Its male cerci are uncommonly short and broad for a species in this series.

Melanoplus phoetaliotiformis sp. nov.

Plate VII., Figure 9.

Of medium size, rather elongate, fusco-testaceous, paler and often much paler beneath. Head rather prominent, plumbeous or fusco-plumbeous, more or less mottled with testaceous, above fuscous with two diverging and enlarging, sometimes obsolete, testaceous stripes, followed on either side below by a piceous postocular band; vertex very gently tumid, scarcely elevated above the pronotum, the interspace between the eyes nearly (♂) or a little more than (♀) twice as wide as the first antennal joint; fastigium pretty strongly declivent, somewhat sulcate, especially in the male; frontal costa fading before the clypeus, enlarging feebly in passing downward (♂) or considerably contracted above (♀), at the ocellus scarcely sulcate, distinctly narrower than the interspace between the eyes, sparsely punctate throughout; eyes of moderate size, a little prominent in the male, distinctly longer, especially in the male, than the infraocular portion of the genæ; antennæ luteo-castaneous or rufous, slightly infuscated apically, about three-fourths (♂) or a little more than half (♀) as long as the hind femora. Pronotum subequal but slightly enlarging both anteriorly and posteriorly, above fusco-testaceous with a plumbeous tinge, on the sides pallid testaceous, below more or less deeply tinged with plumbeous, with a plumbeo-piceous postocular band on the prozona, rarely edged above with dull testaceous, the disk gently convex and passing without angulation but only a rounded shoulder into the subvertical lateral lobes, which are slightly tumid on the prozona; median carina tolerably distinct, percurrent, subequal, but a trifle more pronounced on the metazona; front margin subtruncate, hind margin feebly convex; prozona distinctly longitudinal (♂) or longi-

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tudinally quadrate (♀), about a third longer than the densely but rather feebly punctate metazona. Prosternal spine moderate, cylindrical, apically tapering, a little retrorse; interspace between mesosternal lobes twice as long again as broad (♂) or longitudinally subquadrate (♀), the metasternal lobes attingent (♂) or subattingent (♀). Tegmina slightly longer than the pronotum, attingent or slightly overlapping, ovate lanceolate, apically acuminate, twice or (especially in the male) sometimes more than twice as long as broad, testaceous or fusco-testaceous. Fore and middle femora a very little tumid in the male, luteo-testaceous marked with fuscous; hind femora luteo-testaceous, feebly infuscated externally and sometimes on the upper part of the inner face with a pair of fuscous blotches, beneath faint orange, the geniculation infuscated; hind tibiæ blue, often luteous basally, with a narrow black postgenicular annulus, the spines black with pallid bases, 11–12 in number in the outer series. Abdomen testaceous above, flavous beneath the extremity in the male feebly clavate, slightly recurved, the supraanal plate hastate, acutangulate, nearly plane, with a rather pronounced median sulcus on the basal two-thirds, its walls not very prominent; furcula reduced to a pair of scarcely perceptible knobs; cerci rather slender, as broad at base as the frontal costa, tapering to less than half the breadth in the basal half, beyond nearly equal but tapering to a blunt tip, hardly incurved, and falling much short of the tip of the supraanal plate; subgenital plate small, simple, of nearly equal width and narrower than long, apically a little pinched above so as to appear faintly tuberculate, the lateral margins meeting apically in an acute angle.

Length of body, ♂, 19 mm., ♀, 25 mm.; antennæ, ♂, 8.5 mm., ♀, 7.5 mm.; tegmina, ♂, 5.25 mm., ♀, 6 mm.; hind femora, ♂, 11 mm., ♀, 14 mm.

19 ♂, 14 ♀. Gazelle, Siskiyou Co., California, Sept. 5, A. P. Morse. Since description, I have found that specimens from Brown's Valley, Traverse Co., Minnesota, sent me by Prof. Otto Lugger and which I had at first supposed another undescribed form, are of the same species.

It bears a close general resemblance to *Phoetaliotes nebrascensis volucris*. With the next species and *M. huroni*, both eastern species, it forms a group apart in the present series, having relatively long tegmina and very simple male cerci.

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Melanoplus incultus sp. nov.

Plate VII., Figure 10.

Of medium size, fuscous or fusco-testaceous, dull flavous beneath, with a broad postocular piceous belt reaching to the posterior margin of the prozona. Head slightly prominent, pallid testaceous (♂) or testaceous (♀) overlaid with fusco-olivaceous, above fuscous, the upper part of the eyes and the postocular belt edged with pallid testaceous; vertex gently tumid, scarcely elevated above the pronotum, the interspace between the eyes half as wide again (♂) or nearly twice as wide(♀) as the first antennal joint; fastigium steeply declivent, very shallowly (♂) or hardly (♀) sulcate; frontal costa failing to reach the clypeus, subequal but enlarging from above downward, a little narrower, especially in the female, than the interspace between the eyes, fully sulcate at and below the ocellus, punctate throughout but especially above; eyes of moderate size, a little prominent in the male, distinctly longer, especially in the male, than the infraocular portion of the genæ; antennæ fusco-testaceous or rufous, lutescent basally, a little shorter than (♂) or about three-fourths (?) as long as (♀) the hind femora. Pronotum subequal, even in the female, the disk fusco-testaceous or fuscous, often obscurely edged laterally with testaceous, gently convex, passing by a rounded shoulder, only in the female simulating lateral carinæ, into the subvertical lateral lobes; median carina feeble, at all distinct only on the metazona and the front of the prozona, obsolete or subobsolete between the sulci; front margin truncate, hind margin very obtusangulate, the angle rounded; prozona quadrate (♀) or longitudinally quadrate (♂), about a third longer than the finely and obscurely punctate metazona. Prosternal spine moderate, erect, very blunt conical; interspace between the mesosternal lobes longitudinally subquadrate (♂) or decidedly transverse (♀), the metasternal lobes approximate (♂) or rather distant (♀). Tegmina a very little longer than the pronotum, overlapping, ovate lanceolate with pointed tips, fusco-testaceous, sometimes dotted with blackish fuscous, the limit between the anal and median areas distinctly marked with flavo-testaceous. Fore and middle femora slightly tumid in the male, flavo-testaceous more or less infuscated; hind femora more or less pallid testaceous, with a pallid pregenicular annulus and twice obliquely and rather narrowly banded with blackish fuscous, besides a blackish fuscous geniculation, more or less flav-

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ous beneath; hind tibiæ red, the spines black, 9-11, usually 10, in number in the outer series. Extremity of male abdomen a little clavate, a little recurved, the supraanal plate triangular, somewhat acutangulate, nearly plane, with a rather slender, percurrent, median sulcus, deep in basal, shallow and inconspicuous in apical half, bounded in basal half by moderately heavy ridges; furcula consisting of a pair of slender, acuminate, parallel fingers, extending over the supraanal plate by less than the length of the last dorsal segment; cerci slender, not nearly so long as the supraanal plate, gently and slightly incurved, at base no broader than the first antennal joint, tapering to about half the width, the apical half equal, the tip bluntly rounded; subgenital plate small, broad at base but tapering a little, and at apex narrower than long, the apex feebly pyramidal and produced to a distinct though rather slight tubercle.

Length of body, ♂, 18.5 mm., ♀, 25 mm.; antennæ, ♂, 8.5 mm., ♀, 8.5? mm.; tegmina, ♂, 6 mm., ♀, 7.5 mm.; hind femora, ♂, 10 mm., ♀, 11.5 mm.

4 ♂, 2 ♀. Foothills five miles west of Fort Collins, July 10, and mountains of Larimer Co., Colorado, July 11, C. F. Baker.

This species is very closely allied to, if it be distinct from, *M. huroni* Blatchl., but appears to differ from it in its smaller size, considerably shorter tegmina, slightly slenderer cerci and less pronounced tubercle of the subgenital plate; the punctuation and the median carina of the metazona are also less pronounced.

Melanoplus huroni.

Melanoplus huroni Blatchl.! Psyche, VIII, 195-196 (1898).

Described by Blatchley from La Salle Island, Michigan. I here merely indicate its place in the series.

Inornatus Series.

To this series can be added one more species, sent me from Arizona by Dr. J. L. Hancock, though it differs considerably from the other members of the series. To accommodate it, the table of the species (Revision, p. 128) may be altered thus:

TABLE OF THE SPECIES IN THE INORNATUS SERIES OF MELANOPLUS.

a^1. Male cerci broadly or rather broadly expanded apically; apical tubercle of subgenital plate blunt.

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b^1. Male cerci rather small and moderately slender, very far from reaching the extremity of the supraanal plate; apex of subgenital plate considerably protuberant.....*franciscanus* sp. nov.

b^2. Male cerci large and broad, reaching the extremity of the supraanal plate; apex of subgenital plate very slightly protuberant.

inornatus McNeill.

a^2. Male cerci very feebly expanded apically; apical tubercle of subgenital plate acute .....*viridipes* Walsh, *decorus* Scudd.*

Melanoplus franciscanus sp. nov.

Plate VIII., Figures 1, 2.

Of moderately large size, heavy, dark fuscous or fusco-testaceous, the female often olivaceous, olivaceo-flavous beneath, with a very broad piceous or fusco-piceous postocular band crossing the prozona. Head moderately prominent, ranging from olivaceous to testaceous, often more or less tinged with fuscous especially on summit, the upper margin of the postocular band edged with testaceous, which extends backward across the pronotum; vertex rather tumid but only a little elevated above the pronotum, the interspace between the eyes rather less (♂) or rather more (♀) than twice as wide as the first antennal joint; fastigium steeply declivent, plane; frontal costa just failing to reach the clypeus, subequal but slightly narrowed above, about (♂) or hardly (♀) as broad as the interspace between the eyes, very shallowly sulcate below the ocellus, biseriately punctate above; eyes moderate, very feebly prominent in the male, much (♂) or a little (♀) longer than the infraocular portion of the genæ; antennæ rufo-castaneous, lutescent basally, nearly as long (♂) or about two-thirds as long (♀) as the hind femora. Pronotum subequal, faintly (♂) or distinctly (♀) enlarging from in front backward, the lower part of the lateral lobes plumbeous or testaceous, the disk dark fuscous or testaceous, in the female often olivaceous (with markings described), gently convex, passing by a rounded shoulder more noticeable on the metazona into the subvertical lateral lobes; median carina percurrent, but feeble between the sulci and most pronounced on the metazona; front margin truncate, hind margin very broadly convex (♂) or very obtusangulate, the angle rounded (♀); prozona distinctly longitudinal (♂) or subquadrate (♀), nearly a half (♂) or fully a third (♀) longer than the rather densely punctate metazona. Prosternal spine rather stout,

* Separated as before, in Revision.

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appressed cylindrical, blunt; interspace between mesosternal lobes fully half as long again as broad (♂) or subquadrate or transverse (♀), the metasternal lobes attingent (♂) or moderately distant (♀). Tegmina fully as long as, generally a little longer than, the pronotum, overlapping, obovate, acuminate, fusco-testaceous or fuscous, in some females fusco-olivaceous, the anal area, or at least its margin next the median area, testaceous or pallid testaceous. Fore and middle femora somewhat tumid in the male, fusco-olivaceous, sometimes testaceous; hind femora moderately heavy, flavo-testaceous, heavily trifasciate with fuscous (sometimes blended on the outer face), besides a fuscous geniculation, the lower face orange; hind tibiæ coral red, the spines black nearly to the base, 11, rarely 12, in number in the outer series. Extremity of male abdomen strongly clavate, much recurved, the supraanal plate broad triangular with a subrectangulate apex, margins feebly flaring basally, and a coarse median sulcus for two-thirds or three-fourths the length, margined by low rather blunt walls; furcula consisting of a pair of minute lobes on either side of the base of the median sulcus; cerci of moderate size, gently incurved throughout, about as broad at base as the frontal costa, tapering to two-thirds that width in the middle, and again expanding to a spatulate oval tip well rounded at apex, and falling far short of the tip of the supraanal plate; subgenital plate of moderate size, the lateral margins strongly concave, being elevated a little basally and rising to the much elevated and flaring apical margin, forming here a stout, blunt, slightly depressed, ascending tubercle.

Length of body, ♂, 21 mm., ♀, 32 mm; antennæ, ♂, 12? mm., ♀, 12 mm.; tegmina, ♂, 8 mm., ♀, 10 mm.; hind femora, ♂, 13.5 mm., ♀, 17 mm.

48 ♂, 21 ♀. San Francisco Mts., Flagstaff, Coconino Co., Arizona, July 30, Dr. J. L. Hancock.

Fasciatus Series.

To this series there is a single addition to make, from California, which adds still more diversity to that little homogeneous group. Its position is best marked by separating it bodily from the rest in the table of the brachypterous species of this series (Revision, pp. 128-129), as follows:

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TABLE OF THE BRACHYPTEROUS SPECIES OF THE FASCIATUS SERIES OF MELANOPLUS.

a^1, Male cerci distinctly decurved apically, as well as strongly incurved. *ablutus* sp. nov.

a^2. Male cerci in no way decurved, or if feebly (fasciatus), then they are not incurved ..... *The remaining species.**

Melanoplus ablutus sp. nov.

Plate VIII., Figure 3.

Below medium size, weak fusco-testaceous or dull, pale testaceous, more or less flavous beneath. Head slightly prominent in the male, flavo-testaceous flecked with fuscous, heavily above as a general rule, but sometimes hardly flecked at all; vertex very gently tumid, scarcely elevated above the pronotum, the interspace between the eyes somewhat broader than the first antennal joint; fastigium rather steeply declivent, distinctly (♂) or slightly (♀) sulcate; frontal costa percurrent, subequal, slightly broader than the interspace between the eyes, feebly sulcate below the ocellus, irregularly punctate throughout; eyes moderate, rather prominent in the male, distinctly longer than the infraocular portion of the genæ; particularly in the male; antennæ luteous, luteo-castaneous, or rufous, lutescent basally, more than two-thirds (♂) or a little more than half (♀) as long as the hind femora. Pronotum subequal, faintly enlarging in the posterior half, fuscous or testaceous above, with a broad postocular piceous band on the prozona, often obsolete in the female, sometimes extended, dulled, over the metazona, beneath which the lateral lobes are flavo-testaceous or subflavous, the disk moderately convex, passing without sign of lateral carinæ into the vertical or subvertical lateral lobes; median carina feeble, especially between the sulci; front margin truncate, hind margin very broadly obtusangulate; prozona longitudinal (♂) or quadrate or subquadrate (♀), one-half (♂) or nearly a third (♀) longer than the densely punctate metazona. Prosternal spine moderate, very blunt conical, a little retrorse; interspace between mesosternal lobes a little longer than broad (♂) or distinctly transverse (♀), the metasternal lobes subattingent (♂) or approximate (♀). Tegmina about as long as the pronotum, obovate, more than half as long again as broad, apically blunt angulate, brownish fuscous, sometimes obscurely dotted with blackish fuscous. Fore and middle femora slightly

* Separated as in the Revision.

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enlarged in the male, testaceous, often infuscated; hind femora pallid or flavo-testaceous, on the upper half more or less obscurely bifasciate with fuscous, the geniculation infuscated; hind tibiæ blue, often more or less pallid along the spiniferous margins, pallescent at base, with a postgenicular fuscous dot posteriorly, the spines black with pallid bases, 10-11 in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate subhastate with acutangulate apex, broadly flaring sides and a rounded depression next the apex with raised edges, and a distinct median sulcus terminating at this depression and bounded by sharp ridges; furcula consisting of a pair of parallel minute denticulations, one on either side of the ridges bounding the median sulcus of the underlying plate; cerci moderately large, laminate, as broad at base as the subgenicular lobes of the hind femora, narrowing to two-thirds that size just before the middle and then expanding nearly as much to an elongate flap, which is a little decurved and as much incurved, its apical half tapering and bluntly rounded, reaching the tip of the supraanal plate; subgenital plate rather small, equal, almost as broad as long, apically a little compressed, the apical margin very strongly rounded, not elevated, entire.

Length of body, ♂, 14.5 mm., ♀, 19.5 mm.; antennæ, ♂ ♀, 6.5 mm.; tegmina, ♂, 4 mm., ♀, 5 mm.; hind femora, ♂, 9 mm., ♀, 11 mm.

2 ♂, 9 ♀. Wawona, Mariposa Co., California, August 13, A. P. Morse.

Alleni Series.

To this series, heretofore represented by only two species of moderate size, from New Mexico, Dakota and Iowa, are now added two more, of small size, from California, collected by Mr. A. P. Morse. They agree closely together and are very different from the two previously known. The species may be separated as follows:

TABLE OF THE SPECIES IN THE ALLENI SERIES OF MELANOPLUS.

*a*¹. Stout and medium sized species. Median carina of pronotum more or less obscured on the prozona; hind margin of pronotum obtusangulate; tegmina as long as or longer than the pronotum; hind tibiæ generally red; male cerci relatively stout and apically angulate.

*b*¹. Tegmina twice as long as pronotum; male cerci relatively long and narrow, fully three times as long as broad ..... *alleni* Scudd.

*b*². Tegmina of about the length of the pronotum; male cerci broad and relatively short, not more than twice as long as broad ..... *snowi* Scudd.

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*a*². Slender and small species. Median carina of pronotum prominent throughout; hind margin of pronotum subtruncate; tegmina shorter than pronotum; hind tibiæ glaucous; male cerci very slender and apically rounded.

*b*¹. Male cerci relatively short, not nearly reaching the tip of the supra-anal plate; apical tubercle of subgenital plate prominent..*nanus* sp. nov.

*b*². Male cerci relatively slender and long, almost reaching the tip of the supraanal plate; apical tubercle of subgenital plate obscure.

ligneolus sp. nov.

Melanoplus nanus sp. nov.

Plate VIII., Figure 4.

Of small size, rather slender, fuscous or fusco-testaceous, rarely testaceous, dull flavous beneath, with a broad piceous postocular stripe crossing the prozona. Head not prominent, testaceous or plumbeo-testaceous, much flecked with fuscous, especially above where it is almost wholly fuscous, the upper margin of the postocular stripe edged narrowly with testaceous; vertex tumid though elevated but little above the pronotum, the interspace between the eyes half as broad again (♂) or twice as broad (♀) as the first antennal point; fastigium steeply declivent, strongly (♂) or scarcely (♀) sulcate; frontal costa almost percurrent, subequal but faintly narrowing above, about as wide as the interspace between the eyes, faintly sulcate at the ocellus, biseriately punctate above; eyes moderate, somewhat prominent in the male, much longer than the infraocular portion of the genæ; antennæ casteneous, luteous at base, often infuscated apically, about two-thirds (♂) or hardly half (♀) as long as the hind femora. Pronotum subequal (♂) or feebly enlarging from in front backward (♀), fuscous but below the postocular stripe plumbeo-luteous, sometimes infuscated, the disk convex, passing by a faint angulation, in the female simulating lateral carinæ, into the vertical lateral lobes, which in the male are faintly tumid on the prozona; median carina distinct, percurrent, equal; front margin faintly convex (♂) or truncate (♀), hind margin very broadly convex or subtruncate; prozona strongly (♂) or scarcely (♀) longitudinal, fully half (♂) or about one-third (♀) as long again as the scarcely more punctate metazona. Prosternal spine small, subconical (♂), or conical (♀), blunt, slightly retrorse; interspace between mesosternal lobes somewhat longer than broad (♂) or decidedly transverse (♀), metasternal lobes attingent (♂) or approximate (♀). Tegmina a little shorter than the pro-

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notum, subattingent, ovate, with rounded subangulate tips, fuscous. Fore and middle femora a little tumid in the male, testaceous, more or less infuscated; hind femora fusco-testaceous, the outer face very obliquely marked with fuscous, sometimes wholly infuscated, subflavous beneath; hind tibiæ very pale sordid glaucous, the spines black on apical half, 11 in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate subhastate, apically strongly acutangulate, nearly plane, the lateral margins slightly raised at the base, the median sulcus pronounced, reaching only the middle of the plate, bounded by sharp and high ridges; furcula consisting of a pair of slender, slightly divaricating spines on either side of the base of the median sulcus, but little longer than the last dorsal segment; cerci slender and short, no broader at base than the first antennal joint, tapering slightly to the middle and then expanding a less amount, the apical portion forming an ovate, very bluntly pointed pad, faintly sulcate externally and failing far to reach the tip of the supraanal plate, the whole a little incurved but otherwise straight; subgenital plate small, subpyramidal, scarcely longer than broad, of equal breadth, the apical margin faintly elevated and forming a conical tubercle.

Length of body, ♂, 14 mm., ♀, 18 mm.; antennæ, ♂, 5.5 mm., ♀, 4.5 mm.; tegmina, ♂, 2.75 mm., ♀, 3 mm.; hind femora, ♂, 8.5 mm., ♀, 10 mm.

27 ♂, 22 ♀. Mill Valley, Marin Co., Aug. 22; San Francisco, Aug. 19; Berkeley, Alameda Co., Aug. 21; and Baden, San Mateo Co., California, Aug. 24, A. P. Morse.

Melanoplus ligneolus sp. nov.

Plate VIII., Figures 5, 6.

Of small size and rather slender, testaceous, or sometimes in the female luteo-testaceous, in the former case conspicuously marked with a broad piceous postocular band crossing the prozona, and with piceous flanks to the abdomen, in the latter case preserving only feeble indications of such markings, in both flavous beneath. Head not prominent, luteo-testaceous, more or less flecked on summit with fuscous, especially in the male, in a broad median belt; vertex tumid, feebly elevated above the pronotum, the interspace between the eyes half as broad again as the first antennal joint; fastigium strongly declivent,

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gently sulcate; frontal costa just failing to reach the clypeus, subequal but faintly narrowed above, about as broad as the interspace between the eyes, scarcely sulcate at the ocellus, biseriately punctate above; eyes moderate, a very little prominent in the male, very much longer than the infraocular portion of the genæ, particularly in the male; antennæ castaneous, luteous toward the base, about three-fifths (♂) or about half (♀) as long as the hind femora. Pronotum subequal, testaceous or luteo-testaceous, sometimes faintly dotted with fuscous, below the postocular band flavo-testaceous, the disk feebly convex, passing by a slight angulation into the vertical lateral lobes; median carina distinct, percurrent, equal, sometimes fuscous; front margin very feebly convex, hind margin subtruncate but with the feeblest possible angulation, often rounded in the male; prozona longitudinal, a half (♂) or a third (♀) longer than the finely and densely punctate metazona. Prosternal spine moderate, feebly conical, very blunt, erect; interspace between metasternal lobes longitudinally subquadrate (♂) or transverse (♀), the metasternal lobes attingent (♂) or approximate (♀). Tegmina a little shorter than the pronotum, attingent or subattingent, broad oval, scarcely angulated apically, testaceous or luteo-testaceous, the greater portion or all but the anal field occasionally heavily infuscated. Fore and middle femora slightly tumid in the male, luteo-testaceous, often somewhat infuscated; hind femora testaceous, the outer face often infuscated especially above, but without fasciation, the genicular arc marked with a black line, beneath more or less luteous; hind tibiæ very pale glaucous or luteo-glaucous, the spines black except at base, short, 10–12 in number in the outer series. Extremity of male abdomen a little clavate, a little recurved, the supraanal plate hastate, very acutangulate, plane or nearly plane but feebly tectiform, the median carina distinct, percurrent between sharply defined ridges; furcula consisting of a pair of minute pointed denticulations or projections on either side of the base of the median sulcus, no longer than the last dorsal segment; cerci slender, as broad at base as the frontal costa, tapering to two-thirds that width in the middle, then enlarging somewhat to form a long oval lobe, bluntly rounded apically and sulcate exteriorly, the whole gently incurved and almost reaching the tip of the supraanal plate; subgenital plate rather small, almost as broad as long, a little tumid and apically very bluntly conical, the margins, as seen from above, forming a strongly rounded curve.

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Length of body, ♂, 17 mm., ♀, 21 mm.; antennæ, ♂, 6 mm., ♀, 5.75 mm.; tegmina, ♂, 3.25 mm., ♀, 4.25 mm.; hind femora, ♂, 10 mm., ♀, 11 mm.

8 ♂, 8 ♀. Berkeley, Alameda Co., Aug. 21; and Benicia, Solano Co., California, Aug. 26, A. P. Morse.

This species closely resembles *M marginatus pauper*, but differs from it in its lighter color, apically rounded tegmina, more distinctly and sharply punctate metazona, externally sulcate male cerci and more bluntly conical subgenital plate. It is most nearly allied to the preceding species, from which it differs by its lighter colors (from which its name is derived), its shorter male cerci and blunter apical tubercle to the subgenital plate.

Cinereus Series.

A single species has been added to this series through the collections of Mr. A. P. Morse in California. The table of the series as given in my Revision (p. 135) may be modified to include it in the group containing cyanipes and cinereus, as follows, using the initial letters of that table:

TABLE OF A PORTION OF THE SPECIES IN THE CINEREUS SERIES OF MELANOPLUS.

*i*1. Furcula of male narrowing uniformly or almost uniformly throughout; hind margin of pronotum very obtusangulate.....*cyanipes* Brun

*i*2. Furcula of male with a considerable part of the apical portion equal and very slender; hind margin of pronotum moderately obtusangulate.

*j*1. Nearly uniform, with only feeble markings; lower apical angle of male cerci much produced inferiorly.....*dealbatus* sp. nov.

*j*2. Considerably diversified in color and much beflecked; lower apical angle of male cerci but feebly or hardly produced inferiorly.
cinereus Scudd.

Melanoplus dealbatus sp. nov.

Plate VIII., Figures 7, 8.

Nearly uniform pale testaceous, with a feeble greenish tinge seen most clearly in the males and on the closed tegmina. Head rather large and prominent, flavo-testaceous or dull flavous, with a faint, broad, slightly fuscous postocular band, extending to the metazona: vertex moderately tumid, somewhat elevated above the pronotum, the

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interspace between the eyes a little broader, especially in the female, than the first antennal joint; fastigium moderately declivent, broadly sulcate, but only very shallowly in the female; frontal costa rather prominent above, equal, just failing to reach the clypeus, slightly broader than the interspace between the eyes, feebly sulcate at and a little below the ocellus, biseriately punctate above; eyes large, moderately prominent, very much longer than the infraocular portion of the genæ, the front margin subtruncate; antennæ flavous, deepening in color to orange at tip, fully (♂) or much less than (♀) two-thirds as long as the hind femora. Pronotum, except for the feeble postocular band and the infuscated sulci, nearly uniform in color, subequal, expanding a little on the metazona, especially in the male; front margin truncate, hind margin obtusangulate, the angle rounded; prozona feebly convex on the disk, passing by a rounded shoulder hardly forming lateral carinæ into the vertical lateral lobes, as a whole subquadrate, very obscurely and rather coarsely punctate, scarcely if any longer than the densely and finely punctate metazona. Prosternal spine moderate, erect, conico-cylindrical, blunt; interspace between mesosternal lobes twice (♀) or many times (♂) as long as broad. Tegmina distinctly surpassing the hind femora, slender, gently tapering, apically well rounded, pale greenish testaceous, sparsely and irregularly flecked minutely with fuscous; wings a little shorter than the tegmina, pellucid, the veins greenish, infuscated about the apex. Fore and middle femora somewhat tumescent in the male, flavous, sometimes with a greenish tinge; hind femora also flavous, with no fasciation, the outer face sometimes a little infuscated, the genicular arc heavily marked in black, the genicular lobes pallid, generally marked with black spots at the base; hind tibiæ very pale glaucous, the spines pallid in the basal, black in the apical half, 10 in number in the outer series. Extremity of male abdomen somewhat clavate, upturned, the supraanal plate subclypeate, a little produced at the tip, the lateral margins a little elevated, the median carina rather slight, percurrent but weak in the middle, lying between rather broad and not greatly elevated walls; furcula consisting of a pair of basally adjacent, laterally somewhat arcuate, long and slender, depressed fingers, equal and moderately broad in the basal third, tapering by the excision of the inner margin in the middle third, and beyond equal again but only a third as broad as the base, apically blunt, reaching fully two-thirds across the supraanal plate; cerci moderately broad, compressed and

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tapering considerably in the basal half, then suddenly bent inward and considerably expanded so as to be as broad apically as basally, while at the same time they are slightly twisted, sulcate and much more laminate and the lower apical angle is slightly produced, tucked beneath the pallium and just fails to reach the tip of the supraanal plate; subgenital plate of subequal breadth, feebly flaring, the lateral and apical margins in the same plane, entire.

Length of body, ♂, 28.5 mm., ♀, 35 mm.; antennæ, ♂, 11 mm., ♀, 10 mm.; tegmina, ♂, 25 mm., ♀, 28.5 mm.; hind femora, ♂, 15 mm., ♀, 18 mm.

5 ♂, 13 ♀. Ceres, Stanislaus Co., California, August 17, A. P. Morse.

The bleached appearance of this insect has suggested the name. It is very closely related to *M. cinereus* and may possibly be more properly regarded as a varietal form of that very variable species, peculiar for its color, the less abruptly and considerably twisted male cerci, and the more pronounced inferior production of their apical angle.

Packardii Series.

Colorado furnishes an aberrant member of this series, forming passage to the succeeding (Collinus) series. The male cerci are not bifurcate, but the lower apical angle is excessively produced and decurved, leaving an angle where an upper fork should be, to bring it in the Collinus Series in the near vicinity of alpinus and infantilis; there being, however, no fork whatever, I have thought it best to place it here and to separate it bodily from the other members of the series as follows:

TABLE OF THE SPECIES IN THE PACKARDII SERIES OF MELANOPLUS.

Cerci of male with the apex symmetrically or almost symmetrically rounded. *packardii* Scudd., etc.*

Cerci of male with the lower inferior angle produced to an acuminate blade. *pilatus* sp. nov.

Melanoplus pilatus sp. nov.

Plate IX., Figures 1, 2.

Rather below the medium size and moderately slender, testaceous, marked with fuscous. Head a little prominent, luteo-testaceous, more or less flecked with fuscous, especially above, where it may be heavily

*Separated as in the Revision, pp. 136-137.

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spotted next the upper edge of the eyes and in a postocular stripe, the latter always present and subpiceous; vertex gently tumid, slightly elevated above the pronotum, the interspace between the eyes considerably broader than (♂) or nearly twice as broad as (♀) the basal joint of the antennæ; fastigium steeply declivent, sulcate throughout, in the male deeply; frontal costa just failing to reach the clypeus, a little narrowed above the ocellus, but below fully as broad as the interspace between the eyes, shallowly sulcate at and just below the ocellus, biseriately punctate above; eyes moderate, not prominent, much longer than the infraocular portion of the genæ; antennæ testaceo-fuscous, becoming fuscous apically, a little more (♂) or a little less (♀) than two-thirds as long as the hind femora. Pronotum moderately slender and rather short, slightly enlarging posteriorly, delicately pilose, the piceous postocular stripe crossing the prozona, but otherwise testaceous or luteo-testaceous, except that the disk may be more or less ferruginous and marked laterally by fuscous stripes; the disk is feebly convex with rounded but moderately distinct lateral carinæ; median carina percurrent but more distinct on the metazona than on the prozona; front margin faintly convex, hind margin rounded obtusangulate; prozona longitudinally (♂) or transversely (♀) quadrate, of the same length as the scarcely punctate metazona. Prosternal spine moderate, faintly retrorse, conico-cylindrical, blunt; interspace between mesosternal lobes slightly longer than broad (♂) or quadrate (♀), the metasternal lobes approximate. Tegmina reaching (♂) or failing to reach (♀) the tip of the hind femora, rather slender, tapering throughout, strongly rounded at apex, testaceous with fuscous veins and a few fuscous spots in median area; wings very faintly infumate, the veins in the apical half infuscated. Fore and middle femora somewhat tumid in the male; hind femora rather slender, luteo- or ferrugineo-testaceous, the outer face almost wholly infuscated, the upper inner face sometimes twice spotted with fuscous, the genicular arc black; hind tibiæ very pale glaucous, the spines black excepting at extreme base, 11–13 in number in the outer series. Extremity of male abdomen feebly clavate, upturned, the supraanal plate triangular with raised margins, the median sulcus percurrent, very distinct, equal, its margins elevated like the lateral margins; furcula consisting of a pair of slight triangular teeth, no longer than the last dorsal segment; cerci stout and slightly bullate at base, immediately and rapidly tapering to a slender median cylinder, which expands apically

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into a slightly decurved as well as incurved, triangular, elongated, apically acuminate lamina, reaching beyond the apex of the supraanal plate; subgenital plate rather small, forming a quadrangular scoop, broad at base, narrowing apically, with the apical margin suddenly and greatly elevated above the lateral margins, broadly convex above and apically externally sulcate.

Length of body, ♂, 19.5 mm., ♀, 20 mm.; antennæ, ♂♀, 7.5 mm.; tegmina, ♂, 12.5 mm., ♀, 14.5 mm.; hind femora, ♂, 11 mm., ♀, 12 mm.

1 ♂, 1 ♀. Mouth of Big South River, Larimer Co., 8000′, August 3; and foothills five miles west of Fort Collins, Larimer Co., Colorado, July 10, C. F. Baker.

Texanus Series.

A considerable number of species are to be added to this series, all collected on the Pacific coast by Mr. A. P. Morse. Moreover, I formerly placed *M. marginatus* in the Plebejus Series instead of here, where it belongs, and to include it also it is necessary entirely to remodel the table formerly given to separate the species. As, moreover, *M. marginatus* is dimorphic, and one form is macropterous, it is necessary to find a place in the general table of the macropterous species for the Texanus Series, not heretofore represented. This is done by altering the table given in my Revision (pp. 136-137), so far as the Packardii, Texanus and Plebejus Series are concerned, in the following manner;

TABLE TO SEPARATE THE MACROPTEROUS SPECIES OF THE PACKARDII, TEXANUS, AND PLEBEJUS SERIES OF MELANOPLUS.

a^1. Apical portion of supraanal plate of male suddenly depressed just beyond the middle; cerci broad or moderately broad, not much narrowed in the middle, more or less suddenly bent inward near tip, exteriorly sulcate at apex.....(Packardii Series.)*

a^2. Supraanal plate of male on the same general plane throughout; cerci slender and much narrowed in the middle, gradually incurved, exteriorly tumid at apex.

b^1. Subgenital plate of male short and broad, as broad as long, as seen from above apically angulate and tuberculate.

(Texanus Series) *marginatus* Scudd.

*The separation of the species of this series is given elsewhere in the present paper.

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b^2. Subgenital plate of male narrower, apically much narrower, than long, as seen from above apically well rounded and simple.

(Plebejus Series) *paroxyoides* Scudd.

Dealing now with the brachypterous species of the Texanus Series we may remodel the table given in the Revision (pp. 129-130) as follows:

TABLE OF THE BRACHYPTEROUS SPECIES IN THE TEXANUS SERIES OF MELANOPLUS.

a^1. Tegmina widely separated, lateral; interspace between mesosternal lobes of male more than twice as long as broad; furcula consisting of a pair of exceptionally broad and short plates.....*dumicola* Scudd.

a^2. Tegmina subattingent, attingent or overlapping; interspace between mesosternal lobes of male less, generally much less, than twice as long as broad; furcula, when present, consisting of a pair of approximate pointed denticulations.

b^1. Subgenital plate of male ending in a conical tubercle.

c^1. Male cerci regularly incurved throughout.....*marginatus* Scudd.

c^2. Male cerci sinuate as seen from above, being incurved and at tip again turned backward .....*variabilis* Brun.

b^2. Subgenital plate of male with no pointed tubercle.

c^1. Tegmina at most no longer than the pronotum, well rounded apically; cerci of male at tip angularly produced below, rounded above.

d^1. Tip of male cerci angulate but not greatly produced below, this portion directed posteriorly more than inferiorly.

e^1. Middle of male cerci scarcely half as broad as the base; furcula distinctly present though minute.....*lepidus* Scudd.

e^2. Middle of male cerci but little narrower than the base; furcula absent.....*ascensus* sp. nov.

d^2. Tip of male cerci not only angulate but much produced, the produced portion directed more inferiorly than posteriorly.

e^1. Larger forms, the males exceeding 18 mm. in length; antennæ of male not exceeding four-fifths the length of the hind femora; furcula present though minute; hind femora of female red.

f^1. Middle of male cerci nearly as broad as the frontal costa at the ocellus, and about three-fourths as broad as the base of the cerci, acuminate at tip; furcula consisting of a pair of beads only; tegmina more or less angulate at tip.....*validus* sp. nov.

f^2. Middle of male cerci only half as broad as the frontal costa at the ocellus and from a half to two thirds as broad as the base of the cerci, the tip produced but well rounded; furcula consisting of a pair of minute thorns; tegmina rounded apically.

algidus sp. nov.

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c^2. Smaller forms, the males not reaching the length of 18 mm.; antennæ of male almost as long as the hind femora; furcula absent; hind femora of both sexes glaucous, very rarely red. ***debilis*** sp. nov.

c^2. Tegmina longer than the pronotum, subacuminate at tip; cerci of male symetrically rounded at apex, above and below.

d^1. Interspace between mesosternal lobes of male hardly more than half as long again as broad; extremity of subgenital plate elevated, but not noticeably recurved ..... ***blatchleyi*** Scudd.

d^2. Interspace between mesosternal lobes of male nearly or quite twice as long as broad; extremity of subgenital plate elevated and considerably recurved..... ***texanus*** Scudd.

Melanoplus ascensus sp. nov.

Plate IX., Figure 3.

Melanoplus ascensus Scudd.!, Appal., viii., 315 (1898)—undescribed.

Slightly below the medium size, dark fuscous or fusco-testaceous, flavous beneath. Head faintly prominent, plumbeo testaceous, more or less, sometimes heavily, flecked with fuscous, above almost wholly fuscous, sometimes with a slender edging of testaceous to the postocular piceous band; vertex gently convex, a little elevated above the pronotum, the interspace between the eyes a little wider than the first antennal joint; fastigium steeply declivent, moderately sulcate; frontal costa percurrent, equal, fully as broad as the interspace between the eyes, a little sulcate below the ocellus, biseriately punctate above; eyes moderately large, a little prominent, very much longer than the infraocular portion of the genæ; antennæ castaneous, pallescent at extreme base, almost as long as the hind femora. Pronotum subequal, very feebly expanding on the metazona, fuscous, with a broad piceous or fusco-piceous postocular band on the prozona, beneath which the lateral lobes are plumbeo testaceous, the disk gently convex, passing by a very rounded shoulder in no way simulating lateral carinæ into the vertical lateral lobes, which on the prozona are faintly tumid; median carina distinct but slight on the metazona, feeble on the prozona, subobsolete between the sulci; front margin truncate, hind margin gently convex; prozona a little longitudinal, about a quarter longer than the rather obscurely punctate metazona. Prosternal spine moderate, erect, feebly conical, blunt; interspace between mesosternal lobes from half as long again as broad to twice as long as broad, the metasternal lobes attingent. Tegmina almost as long as the pronotum, attingent, obo-

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vate, strongly rounded apically, less than twice as long as broad, fusco-testaceous. Fore and middle femora slightly tumid, dark plumbeo-testaceous; hind femora not very slender, pallid testaceous, trifasciate with fuscous so broadly as to blend through most of the femur, leaving only pallid patches in rather striking contrast to the rest, the under surface and basal half of inner surface deep orange; hind tibiæ dark blue with a dark postgenicular dot, the spines black almost to the base, 11-12 in number in the outer series. Extremity of abdomen clavate, considerably recurved, the supraanal plate at base equal, beyond triangular, the apex somewhat acutangulate, the lateral margins flaringly elevated at base, the median sulcus percurrent, rather shallow, broadening apically, the walls low, especially apically; furcula wanting; cerci moderately stout, not very long, incurved throughout, at base rather broader than the frontal costa, narrowing in the middle to three-fourths the basal width, generally more by excision of the upper than of the lower margin, beyond enlarging slightly, a little decurved and ending with a rounded angulation, this apical portion more strongly incurved; subgenital plate not very large, flaring, of subequal width, and but little if any longer than broad, the lateral and apical margins in the same plane, and as seen from above forming a strong curve.

Length of body, 18 mm.; antennæ, 9.5 mm.; tegmina, 4 mm.; hind femora, 10 mm.

5 ♂. Mt. Shasta, northern California, just below the forest line, Sept. 2; Portland, Oregon, Sept. 19, A. P. Morse.

This species is more nearly allied to *M. lepidus* Scudd., from which it differs distinctly in its stouter cerci and the absence of a furcula.

Melanoplus validus sp. nov.

Plate IX., Figures 4, 5.

Of medium size, moderately stout, fusco-griseous, dull testaceous beneath, with a broad postocular piceous or subpiceous stripe extending over the prozona, sometimes obscure in the female. Head not prominent, dull testaceous, more or less deeply flecked and dotted with fuscous, above almost wholly fuscous or infuscated, the postocular stripe narrowly and often obscurely edged above and below with testaceous; vertex gently tumid, not or scarcely elevated above the pronotum, the interspace between the eyes fully half as broad again (♂) or twice as broad (♀) as the first antennal joint; fastigium con-

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siderably declivent, broadly (♂) or scarcely (♀) sulcate; frontal costa percurrent or almost percurrent, equal or faintly narrowed above, scarcely narrower than the interspace between the eyes, scarcely sulcate below the ocellus, irregularly punctate; eyes moderately large, a little prominent in the male, somewhat longer than the infraocular portion of the genæ; antennæ dark castaneous or rufo-castaneous, often infuscated apically, about four-fifths (♂) or about two-thirds (♀) as long as the hind femora. Pronotum very feebly and gradually enlarging from in front backward, fusco-testaceous, rarely rufo-testaceous, often heavily and coarsely punctate with fuscous, dull testaceous below the postocular stripe, the disk gently convex, passing, on the metazona only and especially in the female, with the feeblest sign of any shoulder into the vertical lateral lobes, which are faintly tumid on the prozona; median carina low but distinct on the metazona, less distinct on the prozona; front margin truncate, hind margin very obtusangulate; prozona subquadrate or quadrate, a third longer than the heavily punctate metazona. Prosternal spine moderately stout, erect, slightly (♂) or distinctly (♀) conical, blunt (♀) or very blunt (♂); interspace between mesosternal lobes twice as long as broad (♂) or subquadrate (♀), the metasternal lobes subattingent (♂) or approximate (♀). Tegmina about as long as the pronotum, overlapping feebly, obovate, subacuminate but rounded, about half as long again as broad, or, in the male, more than that, fusco-testaceous, often dotted obscurely with fuscous. Fore and middle femora considerably tumid in the male, testaceous, more or less infuscated; hind femora testaceous, heavily angulato-bifasciate with fuscous, the geniculation fuscous, the under surface dull luteo-flavous; hind tibiæ variable, pale glaucous, dull luteous more or less infuscated, or pale dull red (the last in the female only), lutescent basally, sometimes pallid along the spiniferous margins, pilose, the spines black at tip, pallid at base, 10-11 (♂) or 11-12 (♀) in number in the outer series. Extremity of male abdomen strongly clavate, considerably recurved, the supraanal plate markedly clypeate, the basal half having subparallel but gently concave sides, the apical half being triangular with more strongly concave sides and acutangulate tip, all the margins a little elevated, the median sulcus distinct and percurrent between moderate ridges; furcula consisting of a pair of the slightest possible knobs or beads on either side of the base of the median sulcus above mentioned; cerci rather large and heavy, tapering gently toward the middle, which is about as broad

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as the frontal costa, then similarly expanding to a piece of about the same size as the base with the addition of a triangular plate formed by the inferior and posterior production of the lower outer angle, the apical half of the whole incurved, the apical process often bent a little inward, bluntly acuminate, and about reaching the tip of the supra-anal plate; subgenital plate moderate, flaring, of subequal breadth and almost as broad as long, the apical margin a little elevated, broadly rounded, entire.

Length of body, ♂, 21.5 mm., ♀, 22.5 mm.; antennæ, ♂, 9? mm., ♀, 8.25 mm.; tegmina, ♂, 5 mm., ♀, 5.25 mm.; hind femora, ♂, 11 mm., ♀, 12.25 mm.

74 ♂, 80 ♀. Portland, Multnomah Co., Sept. 18; Corvallis, Sept. 15, and Philomath, Benton Co., Sept. 15; Divide (Cottage Grove), Lane Co., Sept. 12; Drain, Sept. 11, Roseburg, Sept. 10, and Glendale, Douglas Co., Sept. 9; and Grant's Pass, Josephine Co., Oregon, Sept. 8. The species was described from 43 specimens, coming from Divide, Roseburg and Grant's Pass, the others having been overlooked at the time of description.

This and the two following species form a group within the series, in which the male cerci are distinctly and considerably decurved at apex.

Melanoplus algidus sp. nov.

Plate IX., Figure 6.

Of medium size, moderately stout, rather dark fuscous, dull testaceous beneath, with a broad piceous or subpiceous postocular band, generally more distinct in the male than in the female, terminating at the metazona. Head not very prominent, dull testaceous, often and especially in the female with an olivaceous tinge, much obscured with fuscous especially above, the postocular band generally edged narrowly above with testaceous; vertex gently tumid, distinctly though slightly elevated above the pronotum, the interspace between the eyes about half as broad again (♂) or twice as broad (♀) as the first antennal joint; fastigium steeply declivent, broadly and scarcely sulcate; frontal costa percurrent or nearly so, subequal but faintly narrowed above, scarcely narrower than the interspace between the eyes, feebly sulcate below the ocellus, biseriately punctate above; eyes moderately large, a very little prominent in the male, somewhat longer than the infraocular portion of the genæ; antennæ rufous, sometimes a little

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infuscated apically, about three-fourths (♂) or two-thirds (♀) as long as the hind femora. Pronotum very feebly and gradually enlarging from in front backward, especially in the female, rather dark fuscous or fusco-testaceous, the latter particularly in the female, dull testaceous below the postocular band, the disk gently convex, feebly shouldered; median carina distinct on the metazona, rather feeble on the prozona; front margin very faintly convex, hind margin very obtusangulate, the angle rounded; prozona longitudinally (♂) or transversely (♀) subquadrate, generally about a third longer than the closely punctate metazona. Prosternal spine moderately large, slightly appressed cylindrical, blunt, erect; interspace between mesosternal lobes varying from less than half as long again as broad to more than twice as long as broad (♂) or from distinctly to very transverse but narrower than the lobes (♀), the metasternal lobes attingent (♂) or rather distant (♀). Tegmina about or hardly as long as the pronotum, attingent or in the male often feebly overlapping, broadly ovate, the tip feebly angulate (♂) or rounded (♀), hardly more than half as long again as broad, fuscous or in the female sometimes fusco-testaceous obscurely mottled with fuscous. Fore and middle femora considerably tumid in the male, testaceous more or less infuscated; hind femora testaceous, heavily angulato-bifasciate with fuscous, the geniculation fuscous, the under surface dull flavous; hind tibiæ varying from dull glaucous to dull luteous (♂) or red (♀), the spines black beyond the base, 10-13, generally 11, in number in the outer series. Extremity of male abdomen strongly clavate, considerably recurved, the supraanal plate clypeate with rather abruptly and considerably elevated margins, the basal half or more subrectangular, the apical portion abruptly contracted with strongly concave sides and produced apex, which with its elevated margins is the continuation of the percurrent sharp and deep median sulcus; furcula consisting of a pair of minute pointed teeth lying on either side of the base of the median sulcus; cerci rather long and not very stout, tapering from the base to the middle and then as gradually expanding to the same width, at the middle from a half to two-thirds as broad as at base and about half as broad as the frontal costa at the ocellus, the apical portion rounded, but unequally, its lower portion being considerably produced but in no way acuminate, the whole gently incurved and nearly reaching the tip of the supraanal plate; subgenital plate moderate, distinctly flaring, gradually broadening apically, where it is nearly as broad as the length,

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the apical margin a little elevated, well rounded, entire, occasionally (by accident?) feebly notched.

Length of body, ♂, 19 mm., ♀, 24 mm.; antennæ, ♂, 8 5 mm., ♀, 8 mm.; tegmina, ♂, 5 mm., ♀, 5.5 mm.; hind femora, ♂, 11 mm., ♀, 12.25 mm.

36 ♂, 36 ♀. Mary's Peak, Benson Co., Oregon, Sept. 16, A. P. Morse.

This species is very closely allied to the common Oregon species of lower levels, *M. validus* just described, differing from it mainly in the slenderness and apical roundness of the male cerci and the rounded tips of the tegmina, characters which appear to be pretty constant.

Melanoplus debilis sp. nov.

Plate IX., Figure 7.

Of rather small size and not very stout, rather dark fuscous, dull flavo-testaceous beneath, with a broad, subpiceous, postocular band extending to the metazona. Head moderately prominent, dull plumbeo-testaceous, more or less infuscated especially above, the postocular band margined with testaceous; vertex feebly tumid, scarcely elevated above the pronotum, the interspace between the eyes considerably broader than (♂) or nearly twice as broad as (♀) the first antennal joint; fastigium steeply declivent, distinctly (♂) or rather feebly (♀) sulcate; frontal costa just failing to reach the clypeus, subequal but generally a little narrowed above, especially in the male, fully as broad as the interspace between the eyes, more or less sulcate below the ocellus, especially in the male where it is sometimes sulcate throughout, biseriately punctate above; eyes moderate, considerably prominent in the male, much longer than the infraocular portion of the genæ; antennæ castaneous, often more or less infuscated, almost as long (♂) or two-thirds as long (♀) as the hind femora. Pronotum subequal (♂) or feebly enlarging from in front backward (♀), fuscous or dark fusco-testaceous, brighter or duller testaceous below the postocular band, the disk gently convex and passing by a distinct but well rounded shoulder into the vertical lateral lobes, which are feebly tumid on the prozona; median carina feeble on the prozona, distinct on the metazona; front margin faintly convex, hind margin broadly obtusangulate; prozona longitudinally (♂) or transversely (♀) subquadrate, fully (♂) or nearly (♀) a third longer than the finely punc-

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tate metazona. Prosternal spine moderate, conical, erect; interspace between mesosternal lobes nearly or quite half as long again as broad (♂) or a little transverse (♀), the metasternal lobes attingent (♂) or not very distant (♀). Tegmina about (♂) or fully (♀) as long as the pronotum, attingent or feebly overlapping, obovate, apically rounded, rarely in the least degree angulate, fuscous, often flecked with darker fuscous. Fore and middle femora testaceous generally more or less infuscated, moderately tumid in the male; hind femora testaceous, broadly, heavily, and on the outer face angularly bifasciate with fuscous, sometimes sharply, sometimes obscurely, the whole geniculation infuscated, the lower face dull flavous; hind tibiæ glaucous or plumbeo-glaucous, in rare instances (of either sex) either wholly or apically red, the spines black beyond the base, 10-12, usually 11, in number in the outer series. Extremity of male abdomen strongly clavate, considerably recurved, the supraanal plate with the basal portion rectangular, the apical sharply triangular, the apex being very acutangulate, all the margins a little raised, the median sulcus heavy, percurrent, but its walls fading apically; furcula wanting; cerci moderately stout and long, tapering to the middle and then similarly expanding, the median portion three-fourths as wide as the base and as wide as the narrowest part of the frontal costa, the apical portion strongly compressed, the lower outer portion produced to a triangular, bluntly acuminate lobe, the whole incurved and failing somewhat to reach the tip of the supraanal plate; subgenital plate moderate, a little flaring, subequal in breadth and nearly as broad apically as long, the apical margin slightly elevated, rounded and entire.

Length of body ♂, 16 mm, ♀, 19.5 mm.; antennæ, ♂, 8 mm., ♀, 6.75 mm.; tegmina, ♂, 3.5 mm., ♀, 4.25 mm; hind femora, ♂, 9 mm., ♀, 10.25 mm.

20 ♂, 26 ♀. Ashland, Sept. 7, and Siskiyou, Jackson Co., Oregon. Sept. 6, A. P. Morse.

This species was taken by Mr. Morse only in the extreme southern part of Oregon, being replaced farther north, even at Grant's Pass in the same water shed, by the larger *M. validus*, which it closely resembles, differing from it, however, distinctly in size and also in the lack of male furcula, the relatively shorter cerci, the more rounded form of the tegmina, and generally in the color of the hind tibiæ of the female; the eyes of the male are also more prominent and the antennæ of the same sex relatively longer.

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PLEBEJUS SERIES.

Melanoplus marginatus, as already stated, should be removed from this to the Texanus Series, while to it should be added a species from New Mexico, submitted to me by Mr. Morse. The table given in my Revision (p. 130) may be thus remodelled:

TABLE OF THE BRACHYPTEROUS SPECIES IN THE PLEBEJUS SERIES OF MELANOPLUS.

a^1. Apical portion of male cerci distinctly sulcate exteriorly.

b^1. Hind margin of pronotum subtruncate or broadly rounded subangulate; interspace between mesosternal lobes of female transverse; male cerci apically truncate, mesially broad, hardly narrower than the base. *calidus* sp. nov.

b^2. Hind margin of pronotum distinctly angulate; interspace between mesosternal lobes of female at least half as long again as broad; male cerci apically rounded, mesially narrow, much narrower than the base. *plebejus* Stal.

a^2. Apical portion of male cerci exteriorly plane or tumid.

b^1. Posterior margin of pronotum distinctly emarginate in the middle; tegmi a widely separated; male cerci elongate, surpassing the supraanal plate; subgenital plate broader at base than apically, its apical margin regularly rounded and even ..... *gracilis* Brun.

b^2. Posterior margin of pronotum rounded truncate, with but feeblest signs of mesial emargination; tegmina attingent or subattingent; male cerci relatively brief, not surpassing the supraanal plate; subgenital plate not broader at base than apically, its apical margin angulate or tuberculate ..... *inops* Scudd.

Melanoplus calidus sp. nov.

Slightly above medium size, moderately robust, testaceo-olivaceous, somewhat infuscated, beneath flavo-olivaceous with a broad subpiceous postocular band crossing the metazona. Head a little prominent, dull olivaceous feebly infuscated, above more deeply, the postocular band margined with flavo olivaceous; vertex gently tumid, distinctly elevated above the pronotum, the interspace between the eyes fully half as broad again as the first antennal joint; fastigium strongly declivent, hardly sulcate; frontal costa failing to reach the clypeus, subequal, as broad as the interspace between the eyes, feebly sulcate below the ocellus, punctate throughout, biseriately above; eyes moderate, but little prominent in the male, only a little longer than the infraocular

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portion of the genæ; antennæ rufous, in the female nearly three-fifths as long as the hind femora. Pronotum rather stout, expanding a little on the metazona, the disk fusco-testaceous, gently convex and passing by a distinctly angular but rounded shoulder into the vertical lateral lobes, which are dull green except for the postocular band; median carina distinct on the metazona, very feeble on the prozona; front margin subtruncate, hind margin subtruncate (♂) or broadly obtusangulate, the angle rounded (♀); prozona a little longitudinal (♂) or quadrate (♀), fully (♂) or nearly (♀) a half longer than the finely punctate metazona. Prosternal spine conical, blunt, slightly retrorse; interspace between mesosternal lobes half as long again as broad (♂) or a little transverse (♀), the metasternal lobes attingent (♂) or approximate (♀). Tegmina slightly longer than the pronotum, overlapping, apically acuminate, fusco-testaceous. Fore and middle femora somewhat tumid in the male, olivaceo testaceous; hind femora moderately stout, clouded exteriorly with fusco-olivaceous margined below with flavous, the inner and lower faces flavous or rosaceous, the former banded interruptedly with flavous and blackish fuscous, the geniculation blackish fuscous; hind tibiæ red (♂) or glaucous (♀), the spines black except basally, 10 (♀) or 12 (♂) in number in the outer series. Extremity of male abdomen clavate, considerably recurved, the supraanal plate large, clypeate, the margins scarcely elevated, the median sulcus distinct and deep, narrowing to a point a little beyond the middle, its walls low; furcula consisting of a pair of thickened disks with slight diverging points, barely extending beyond the margin of the last dorsal segment; cerci large, rather stout, quadrangular plates of subequal width, contracted slightly in the middle, the apex truncate, with its angles, and especially the lower, slightly rounded, the whole but little more than twice as long as broad, lying in a vertical plane, but a little incurved, and the outer face of the apical half a little depressed; subgenital plate not very large, moderately narrow, but the apical margin considerably elevated, rounded angulate as seen from behind, entire.

Length of body, ♂, 20 mm., ♀, 21.75 mm.; antennæ, ♀, 7.5 mm; tegmina, ♂ ♀, 6 mm.; hind femora, ♂ ♀, 10 mm.

1 ♂, 1 ♀. Gilman's Ranch, Eagle Creek, White Mts., Lincoln Co., New Mexico, 7000 feet, August 10–16, E. O. Wooton (A. P. Morse).

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ASEMOPLUS Scudder.

To this supposedly monotypic genus, Walker has added a new species from the same general region as the type. It is wholly apterous and hence the generic description needs to be in so far modified, as well as the table of the genera in my Revision (p. 12) where the category $A^3\ b^2\ c\ ^2d^2\ e^1\ f^1$ should read: Tegmina rarely absent (instead of always present); and further in the final category for Asemoplus (p. 14) the words "when present" should be added after the word "tegmina." The two species may be separated thus:

TABLE OF THE SPECIES OF ASEMOPLUS.

Tegmina normally present;* abdomen mesially striped above with yellowish; male cerci reaching as far back as the tip of the supraanal plate, slightly decurved at tip ..... *montanus* Brun.

Tegmina wanting; abdomen mesially striped above with black; male cerci scarcely reaching so far back as the tip of the supraanal plate, in no way apically decurved..... .... *nudus* Walk.

*They are sometimes absent from one side or the other, apparently by accident; out of fourteen specimens seen only one had them absent on both sides.

Asemoplus nudus.

Asemoplus nudus Walk.! Can. Ent., XXX., 197-199, pl 6 (1898).

Near Sandon, British Columbia, 2600 feet, and Mt. Piron, near Laggan, Alberta, 7000 feet.

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THE HABITS OF AMERICAN CICINDELIDÆ.

BY H. F. WICKHAM, IOWA CITY, IOWA.

When we consider that the tiger beetles are perhaps more general favorites with collectors than any others, it is surprising how little has been made known of their habits. A bare statement of locality, with, perhaps, a date, is all the information usually given, and an entomologist visiting a region known as the habitat of several species might well miss taking many of them through lack of knowledge of the peculiar conditions under which alone certain ones occur.

From time to time certain writers have given short notes, chiefly in the publications of local societies which are often difficult of access, on the species occurring in their neighborhood. In this way a great deal of interesting information has been handed down, but unfortunately nearly all the material of this character has referred to the beetles found in a restricted, if rich, district and the number of species whose habits have been recorded is, after all, quite far from numerous.

Since the time of Thomas Say, two papers of a revisional or monographic nature have treated the North American species of Cicindelidæ. The first, from the pen of Dr. Le Conte gave short notes as to the conditions under which some were taken, while the second, by Schaupp, added a very little more of this nature. Perhaps the tiger beetles of Kansas and the adjacent states have received more biographical attention than those of any other portion of the continent, and we find articles treating of their lives from the pens of Professors Snow and Popenoe, Dr. Williston, Messrs. Cooper, Brous, Knaus and Jones. Most of these papers came out in the Transactions of the Kansas Academy of Science. In California Mr. Dunn and Dr. Blaisdell have both contributed to "Zoë" remarks on the Pacific species. In the east, nearly all the published information refers to the forms found about the collecting grounds of the New York and Philadelphia entomologists, with here and there some scattering items from elsewhere. The chief contributors from this district are, as far as I have

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been able to discover, Messrs. Leng, Liebeck, Davis, Johnson, Moffat, Schaupp and Dr. Gould. The south has been almost entirely neglected but for a chance item here and there in lists or other contributions.

All of the above writers have been consulted in the preparation of the following pages. In addition I have had the pleasure of receiving ready and valuable aid from most of our best known collectors of Coleoptera. My own travels have thrown me in contact with a large percentage of the described species of *Cicindela* and any statements not otherwise credited may be considered to rest on my own responsibility. While I have not in any case cited the place of publication of items borrowed, I have nevertheless mentioned the name of the author, except in a very few instances where the facts have been in circulation for such a length of time as to have become general property and to leave their original source in doubt. Most of the work is based on communications by letter and I desire here to record my thanks to many friends who so cordially responded to my call for assistance.

It is hoped that the article will serve as an aid to collectors who may be visiting a strange country as well as prove of interest to those who know most of our species of these most beautiful beetles only as cabinet specimens. It may also answer to show what we still lack in knowledge of certain forms.

Amblychila cylindriformis Say. This species is said, by Professor F. H. Snow, to hide during the day in burrows, especially those made by the Kangaroo Rat. Soon after sundown they come forth to hunt over their favorite grounds, the sloping clay-banks of western Kansas They are slow in movement and appear to have no keen sense of sight, trusting apparently to stumbling on their prey which consists of various insects, particularly the Orthoptera and Lepidopterous larvæ. Mr. H. A. Brous says that they feed also on effete matter.

A. baroni Rivers. I have seen only one specimen of this. It was taken by Dr. Edw. D. Peters, Jr., from beneath a log lying in a rather damp spot by a small mountain stream which follows a road in the Pinal Mountains, north of Tucson, Arizona, June. Mr. Chas. Fuchs writes me that the type was collected by O. T. Baron in Pima Co., Arizona, at an elevation of 5000 feet. It was found dead in a cañon.

A picolominii Reiche. From Mr. Fuchs I learn that River's specimens of this insect were taken at Peach Springs, Arizona. The Cali-

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fornian entomologists lean towards the belief that there are three species of Amblychila, concerning which contention see Zoë, Vol. IV., 1893, pp. 222 *et seq.*

Omus dejeanii Reiche. This is confined more particularly to the north Pacific coast region and is to be found during the day under logs in the forests. By breaking up very rotten fallen trunks of trees, the insect may sometimes be obtained in numbers. The Rev. Geo. W. Taylor (Can. Ent., 1886) writes that it may often be seen on roads, wandering about as if in search of prey. I have taken it in June and July.

O. edwardsii Cr. Placer and Sierra Co's., California July and August (Fuchs).

O. audouinii Reiche. In habits and time of appearance this species resembles *O. dejeanii*, but seems rather more partial to open spots. Near Victoria, B. C., I have taken it quite commonly under logs washed up on the open beach. Near Portland, Oregon, it was tolerably common about logs in the parks and woods.

O. submetallicus Horn. "The published locality, Eldorado County, California, as well as the time, June, is incorrect. Mr. James Behrens found the type specimen personally, in the mountain regions of Sierra Co., California, in September. I received this notice from Mr. Behrens himself" (Fuchs, *in litt.*). I have heard of a specimen being taken in the state of Washington.

O. hornii Lec. "My male specimen was collected in northern Mariposa Co., California, in June, at an elevation of 2200 feet." (Fuchs, *in litt.*)

O. californicus Esch. "San Francisco, Alameda, Marin and Mendocino Co's., California Very common on the foot-hills from January to May." (Fuchs, *in litt.*)

O. sequoiarum Cr. "Tuolumne Co., California, on edges of meadows, July and August." (Fuchs, *in litt.*)

O. ambiguus Schaupp. "The original type, which I have in my collection, was collected in the Mount Shasta district. No particulars." (Fuchs, *in litt.*)

O. lecontei Horn. "Monterey Co., April." (Fuchs, *in litt.*)

O. lævis Horn. "A female was taken on the Tule River, Tulare Co., California, in June. Mr. W. G. W. Harford collected two speci-

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mens at Lambert's Soda Springs, Tuolumne Co., eleven miles from the base of Mt. Conners, near the borders of the meadows." (Fuchs, *in litt.*).

Tetracha carolina Linn. During the day this species may be found under stones or logs in rather open damp places. It seems to have a great fondness for the vicinity of water, being frequently met with in extremely muddy situations, even resting in the cracks of sun-baked clay which has "caked" on the surfaces of mud-pools. At night it roams about in search of prey and may be taken freely at light. In Arizona I have seen dozens of them about gas-lamps during the earlier hours of darkness. It is very widely distributed, occurring in the West Indies, South and Central America, and extending its range from the Atlantic to the Pacific in the southern United States. My specimens were all captured in July and August.

T. virginica Linn. Has much the same habits as the preceding. I have found it under stones along the banks of water-courses, and it is said to come in great numbers to street lamps in the southeastern states. I took it at Nashville, Tennessee, in August.

Cicindela pilatei Guér. Said to be found in woods in the lake region of Louisiana and Florida, coming sometimes to camp-fires at night. The variety *belfragei* Sallé has been found commonly near Salina, Kansas, by Mr. A. W. Jones, who has taken it by overturning hay-cocks in fields at an altitude of less than fifty feet above the Smoky Hill River bottom. He says that it is seldom seen during the heat of the day, but appears in the roads about four o'clock in the afternoon, and, like *Tetracha*, is crepuscular (Bull. Bklyn. Ento. Soc., VII., p. 75). Prof. E. A. Popenoe writes me that he has taken the species on dry loam soils in cornfields at cultivating time in Riley County, Kansas. It occurred on reasonably clean ground, not in swarms but straggling. Mr. Hugo Soltau collected it near Covington, Louisiana, by using a lantern.

C. celeripes Lec. A wonderful little species, almost indistinguishable from a large ant when running. It was taken in abundance at one time by Prof. Popenoe, at one limited locality in Riley County, Kansas. The soil was dry, sandy loam, covered with short-cropped grass and was open prairie land My own experience with the insect is rather limited. Several years ago I took one specimen among short grass by a little stream near Iowa City. This summer (1898) I found

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a few more, one July day, near the upper end of a deep gully, washed in clay soil by the rains a mile west of town. The time was about four o'clock P. M , and the little fellows were apparently at rest in the shade of the high bank, one pair in copula At Council Bluffs, on the Missouri River, I had a few hours to spare between trains while on my way to Denver in June, 1897, and went up the high clay hills just back of the town, following one of the numerous paths Near the top of one of these bluffs I noticed a *C. celeripes* run across the path, and careful work in the way of frightening them out by disturbing the scattered grass-clumps (under which they seem to lie) was rewarded by the capture of six or eight examples They seemed to make instinctively for cover and at this time of day — it was just after noon and very sunny — were so wonderfully agile that in spite of inability to fly the chances of escape were many. On my return about a month later I spent a short time, near the end of the afternoon, at the same spot and found a few more. It is evident that the insect is not entirely crepuscular in habit, though I had thought it might be partially so.

The variety *cursitans* Lec., has been taken by Mr. Hugo Soltau at Covington, Louisiana. He found it in abundance on yellow sand in open timber a little way from the banks of a small stream. I have one specimen which was taken by my brother, climbing a steep bank along the Iowa River near Iowa City.

C. obsoleta Say. Has been taken, with its varieties, by Prof. E. A. Popenoe in Meade County, Kansas, on roads or prairies of loamy or clayey soil. It occurs in a straggling manner, not in companies, and is shy. Short growth of vegetation does not repel it, but it prefers bare ground. Mr. Roland Hayward took the variety *vulturina* Lec., at Durango, Colorado, between July 25 and August 8, and in the San Juan Valley, Taos County, New Mexico (4500 feet), between August 1 and 4. It occurred on adobe soil on the plains, among the sage-brush and greasewood, scattered or singly. I found an example of the variety *prasina* Lec., at Seligman, Arizona, in July. It was out on the dry open prairie in the brush. Mr. Knaus has it from dried-up beds of lakes and pools near Coolidge, Kansas, August 12.

C. unipunctata Fabr. This rather rare species I have met with only once — on a dark rainy day at the end of May, in Cedar County, Iowa. I had been collecting along the river bottom and saw this

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specimen run across the path into the dead leaves by the side of it. Mr. Nathan Reist informs me that he takes it in July near York Furnace, Lancaster County, Pennsylvania, on little paths running through wooded hills along the river. He says that instead of flying it creeps under leaves and stones and is easily captured, though occurring only singly or in pairs and not in company with any other species. Mr. Geo. A Ehrmann of Pittsburg, Pennsylvania, has given me the following interesting data concerning his experience with this species, which he finds only at Brown's Wood, near his home, between June 25 and July 28: "It is found only in uplands, always in the densest part of the woods, concealed along the hard trodden paths where the color of the insect corresponds with the ground. The edges of the paths are usually lined with a scanty growth of grass, intermingled with dry leaves, sticks and stones. It is the most difficult insect I ever hunted, and is, in my estimation, only caught by chance. It occurs only singly, and depends on its swiftness of foot for escape. I never take it except on the calmest and sunniest days; when hunting in localities where I know they are found I move carefully along the paths with my sight centered six or eight feet ahead of me, ever alert for the least motion. The instant I perceive a movement like the faintest shadow I drop onto the spot with one of my hands and nine times out of ten secure the object. But three times out of the nine I catch either a spider or a shadow — the latter has usually disappeared when I look for it. It is out of the question to take *C. unipunctata* with a net." Mr. H. W. Wenzel says it is nocturnal.

C. longilabris Say. I found it at Bayfield, Wisconsin, in paths or roads running through woods, during the months of June and July. It was seen but rarely and frequented spots where the ground was beaten hard. Dr. J. L. Le Conte says that it frequents paths in grassy and bushy places, taking refuge in herbage if disturbed The variety *laurentii* Schpp , is rather abundant in some parts of the Rocky Mountain region of Colorado. I took it at Georgetown and Ouray on stony banks or in roads and paths at some distance from water during the months of June and July. As a rule it is not wild and may be captured with little difficulty, even without the use of a net. If disturbed it usually flies rather heavily and for a short distance only, so as to be readily tracked if it escapes the first time. *C. perviridis* Schpp., is found in the same situations as *C. laurentii* and appears to have the same habits. It is, however, also of wider range, Mr. Chas.

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Fuchs writing that he has the type from Placer County, California. It was taken in August. The black form called *montana* Lec., seems much more entitled to specific rank; it is to be taken on alkaline flats among scant vegetation near Laramie, Wyoming. Prof. Bruner sent me some that he got at Pocatello, Idaho. My observations at Laramie go to show that it is not an abundant species but rather easy of capture as it runs about on the scantily covered surface of the flat. Dr. Williston took it at various localities in southern Wyoming early in spring, more frequently along hillsides and not especially on bared ground.

C. scutellaris Say. This extremely variable species is partial to dry sandy spots where there is comparatively little vegetation. The type form I have taken in Colorado (at Cañon City and Denver) on open sandy flats not in the immediate vicinity of water. In the latter locality I found it on vacant lots within the city limits during the month of June. The Cañon City specimens were found about the middle of May. Mr. Ernest J. Oslar writes that he has found it among the foot-hills at the mouth of Bear Creek Cañon, Jefferson County, Colorado, from April 15 to May 10. The flight is rather weak and slow. The form *unicolor* Dej., was seen in abundance by Mr. Soltau in sandy roads and dry runs at Spring Hill, a suburb of Mobile, Alabama, occurring early in spring and again late in the fall. Mrs. A. T. Slosson observed it flying and lighting in sandy paths through the scrub of Florida. Mr. Oslar reports it from the same localities as cited above for his captures of *scutellaris* and adds Boulder County, Colorado. He finds it double brooded, the first occurring from April 25 to May 30, the second in September, not uncommon, but hard to catch. The black form with lateral spots, *modesta* Dej., has been found in the vicinity of New York City. "Flies on sand dunes from April, when the first brood appears. Rare during the summer, more abundant on the appearance of the second brood in the fall" (Davis). Mr. Johnson writes, "First brood in June. Occurs on sandy spots where grass and weeds are frequent, not on bare sand hills." Mr. Kemp takes it in a variety of situations near Clementon, Woodbury and Westville, New Jersey, where it is locally abundant on sandy paths by edges of woods, and also in open fields. *C. nigrior* Dej., in which the lateral spots are wanting, was taken by Mr. Johnson in company with *modesta*. Mr. Soltau reports it with *unicolor* from Spring Hill, Alabama. The green and spotted *rugifrons* Dej.,

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is also said by Mr. Johnson to consort with *modesta* so that the wonderful color-variation is evidently not due to any climatic conditions in spite of the fact that certain types are more or less characteristic of certain localities. *C. lecontei* Hald., is the form most abundant in the Mississippi Valley. I have taken it rather commonly at Iowa City and Independence (Iowa), where it always occurs on dry, deep sand, quite away from water. The only difficulty attending their capture is the avoidance of sand burrs which flourish in just such conditions as are most favored by the beetles. The flight is short and weak. It is double brooded, the first brood appearing in April, the second in August and September. On one occasion I found the fall brood in countless swarms along a sandy road just south of Iowa City, but have never since seen it more than fairly abundant in that neighborhood. Mr. Knaus has found it sparingly at Manhattan and near Medora in Kansas and near Superior, Nebraska, at the two last places in company with typical *scutellaris*. He finds it always in sandy localities. Mr. Knab reports it from Hennepin, Illinois. Many Canadian records are extant, but as far as I can ascertain this form is always confined to sandy dry spots. Mr. Edw. D. Harris states that *rugifrons* and *modesta* are very sensitive to wind, disappearing on the appearance of the least breeze.

C. pulchra Say. "Extremely abundant in southwestern Kansas and southern Colorado. They always choose perfectly bared spots of loam on high ground and for that reason are oftenest seen along unused roads. Abundant in the valley of the Smoky Hill River, extending nearly as far east as Fort Hays," (Williston). Mr. Knaus has it from near Wallace and Coolidge; at the latter place he took one on July 27, but writes that it is usually found in May and June. Professor Snow considers late summer and fall the best collecting time. Professor Townsend took it near Navajo Springs, Arizona, and writes "I found it in the dry sandy road, white sand, I think, no water near. I also got it on red bare soil about the same color as the insect, being an iron red." This was on July 24. Mr. Oslar has captured it in the foothills at Chimney Gulch, Douglas County, Colorado, between May 7 and July 1. He considers it hard to capture, local, and rare.

C. sexguttata Fabr. In the vicinity of Iowa City this species is found chiefly about wood-roads, though sometimes seen on sidewalks within the corporate limits. Occasionally takes shelter under chips and pieces of wood which may be lying about. Rather easy to capture

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since it takes flight less readily than usual. Said to occur in cotton-fields in Mississippi. Mr. Edw. D. Harris has taken a dark olivaceous-green variety of which he writes me as follows: "I took four specimens in all. The type in that locality—Litchfield County, Connecticut,—is found at lower levels but not in profusion. All these individuals [of the variety] were taken at an elevation of 1000 or 1200 feet, in open road, not where the type is apt to be found, and were more sluggish than 6-*guttata*. It was evidently not common, for during the entire month of August I took but four, and these singly in widely separated localities. The point which I should wish to emphasize is that neither of the specimens were taken in localities where the type might be expected. In the cabinets of the American Museum of Natural History Mr. Beutenmüller has a specimen taken last summer [1897] in the mountains of North Carolina. There is no doubt of the species, but I have wondered if others had met with this variety in high grounds and to what extent it prevails." Further notes on this form are desirable and I shall be pleased to hear from any one who has taken it. *C. violacea* Fabr., the variety in which spots are entirely lacking, seems to have been the subject of no printed notes regarding habits, but I hear from Mr. Warren Knaus that in Kansas it is found sparingly along wood-paths and roads. It is not easily taken. Specimens are usually green, a few being deep blue. He has it from Manhattan, Onaga, and the vicinity of Benedict. *C. patruela* Dej., where the spots unite to form a more or less complete median band, seems common in Pennsylvania. Mr. Nathan Reist takes it at Chiques Rock, Lancaster County, on wooded river hills where the soil is a mixture of gravel and loam, well overgrown with grasses and ferns. It occurs in company with the type and is quite abundant but not very wary. He finds it sometimes under leaves, when it can be captured with the bare hand. The first brood is found in May, the second during early September. Mr. Geo. Ehrmann met with it but once at Pittsburg, on a stony, barren hillside; it was seen by him in numbers, however, at Cresson, Cambria County, on the summit of the Alleghenies. Mr. S. T. Kemp furnishes the following note on the blackish variety, *C. consentanea* Dej.: "I find it inhabiting the edges of a good-sized piece of woods on dark soil, also on bare spots in the same woods. It is very wary, and when disturbed, seems to take a longer flight than the other species. The timber is on higher ground than the surrounding country. Atco, New Jersey, September. Rare."

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C. purpurea Oliv. In grassy places by roads or in paths through meadows. It is known to hibernate. At Bayfield, Wisconsin, I found it in sandy roads through pine forests in July. Mr. Kemp finds it in May and September on darkish sandy ground along edges of timber in the vicinity of Atco, New Jersey. The black race, *audubonii* Lec., is taken by Mr. P. C. Truman at Pierre and Volga, South Dakota. He writes that it is less rare at the former place and is confined, so far as his observation goes, to high grassy prairies in a light clayey loam soil where some sand is present, never frequenting a heavy clay soil nor spots where it is at all damp. It is not gregarious, no more than two or three being seen together, and, though occasionally found with or near *purpurea* and *vulgaris*, the association always seemed accidental. He has not been able to find any spring brood, always taking the species after August 25 (though I had one in my own collection from Brookings, South Dakota, with the date April 18), and it seems most plentiful in September, continuing until hard frosts. To find it he goes out on warm, still afternoons, slowly following some little-used country road through or near unbroken prairie where grass is thin and short. Thus an occasional individual is scared up, and flying a short distance, alights again in the bare track or among the adjacent grass. Mr. Knaus has "a single specimen only, taken in August, six miles north of Salina, Kansas, along red clay roadside in company with *purpurea* and *splendida*." Dr. Williston met with it abundantly in early spring. He found it most commonly in open clayey bottoms of ravines near the chalk washes on the Laramie plains, Wyoming. In Colorado, Mr. Oslar has found it occurring "pretty generally over the foot-hills" about the end of March. *C. graminea* Schaupp, the green form, was described from Kansas and California. I took it at Denver, on a vacant lot, in June, and Mr. Oslar finds it well distributed over the foot-hills at the same time as the preceding variety. There are two broods. At Volga, South Dakota, Mr. Truman takes *graminea* abundantly, some of the specimens running closely into the type form of the species. He wrote that it is "double-brooded, being seen in May and June and again in August and September. It delights in company, congregating with *purpurea*, *vulgaris*, *repanda* and *12-guttata* on sandy lake shores and in sandy pits and cuttings. I have oftenest found it on the margin of one of our small lakes, along the side bounded by a wooded bluff. Have also taken it on an old prairie road occasionally, but that seemed not

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its usual habitat. Perhaps *graminea* has less right to a name than *audubonii;* for while the latter seems almost entitled to specific rank, always distinct in color and habits from the other varieties, *graminea* with me is always found with *purpurea*, has the same habits and gradually shades off in color to and from the type." *C. cimarrona* Lec., is a form apparently confined to the Rocky Mountain region in Colorado and New Mexico. Prof. Popenoe tells me that it occurs singly on bare clay soils about open prairies in South Park, Colorado. The variety *decemnotata* Say, is more widely scattered. Dr. Williston writes that it has habits somewhat similar to those of *montana*, being specially distributed in southern Wyoming on high grounds among the buffalo grass. Mr. Oslar informs me that he finds it abundant on certain lots in Denver, April 15th. In the foot-hills he gets it occasionally, later in the season. However, the specimens sent me prove to be *denverensis* Casey, which must belong with the aggregate now ranking as varieties of *purpurea*. The variety *limbalis* Klug, is quite abundant at Iowa City, chiefly on steep, bare banks (whether of sand or clay) by roadsides. It appears with the first warm days of spring and is more readily captured than most of our tigers. In Colorado, Mr. Oslar finds it in the dry bed of Cherry Creek near Denver. It appears there the first week in April. The names *spreta* Lec., and *amœna* Lec., are applied to forms which I have never seen and regarding whose occurrence I can get no information. That called *splendida* Hentz, is more or less abundant in Kansas. Prof. Popenoe took it in Riley and Shawnee Counties, in February, March, April and September on dry clay banks exposed to the sun, along roadsides or in gullies through the prairies. It is rather plentiful but straggling in its occurrence. Mr. Knaus has it from various localities in eastern and central Kansas, where he finds it on sandy or clayey roads, sometimes as late as October. My personal acquaintance with the species, in life, is limited. I took it in June on a sandy lot in Denver, in company with the next species.

C. formosa Say. The red western type form is sometimes quite abundant on dry, open, sandy spots, among short grass and weeds, not in the immediate vicinity of water. It also frequents sandy roads in company with *scutellaris*. Wary and difficult of capture, though so conspicuous. Flight strong, often sustained. I have met with it at Cañon City, Colorado, in May, and at Denver in June and July. Mr. Oslar takes it at many localities in Colorado, about the foot-hills and

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prairies. He gets it from April to June, and again, in smaller numbers, in the fall. The brown eastern form, *generosa* Dej., is rather abundant at Iowa City and Independence, Iowa, on sandy roads or flats, associating with *C. lecontei*, but much more wary and difficult of capture. At Chicopee, Massachusetts, Mr. Knab finds it abundantly in bare sandy places in April, May, June and October. *C. venusta* Lec., catalogued as a variety, is now claimed by Mr. H. C. Fall as a good species. I found it at Denver, flying with *formosa*, which it greatly exceeded in numbers. At Bismarck, North Dakota, it was rather common early in September, along sandy roads through the Missouri bottom.

C. latesignata Lec. I found it abundant on Coronado Beach at San Diego, California, in August. It flew on the white sand above the immediate reach of the tide. Dr. Blaisdell took it also in April and May, often in company with *hirticollis*, *gabbii* and *hæmorrhagica*, on beaches, or sometimes on alkaline flats near sloughs. Mr. Fall says it occurs throughout the whole year but most commonly in midsummer. The variety *tenuicincta* Schaupp, was found by Dr. Blaisdell at San Diego under the same conditions as the type.

C. fulgida Say. I found this species at Albuquerque, New Mexico, in September, on a flat sandy spot a mile from the river and overgrown with short, scattered grass clumps and a few weeds. Near Lincoln, Nebraska, they were once common in the great alkaline flat locally known as the "salt-basin," where I saw them flying early in May. They are less agile than many of the tigers. Dr. Williston records it as "abundant in western Kansas and southern Wyoming, frequenting upper banks contiguous but at some distance from water among buffalo grass. Quick of flight." The form *willistoni* Lec., is perhaps entitled to specific rank, at least so contend some of our Kansas brothers. A note kindly sent me by the discoverer, after whom it was named, reads thus: "The only place that I found it was at the end of Lake Como, Wyoming, an alkaline lake. They occur almost exclusively by themselves on the bare alkaline mud. They are very wild and difficult to capture, fairly abundant but isolated. My recollection is that no other species were found with them. My specimens were taken early in June, 1878. Not a single specimen was found elsewhere in the vicinity and it will not live among grass or vegetation like its nearly related forms."

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C. senilis Horn. "About San Diego in damp places away from the coast" (Dunn). May to September. Mr Koebele found it in Death Valley and Mr. Fuchs has it from Inyo and Tuolumne Counties, California, June and July. Mr. Soltau says that he has captured great numbers in April near Salt Lake City on the low marshy grounds eight miles out towards the lake where the soil is quite sandy and covered with a thin coat of mud. It is probable that this note refers to what Captain Casey named *C. echo.*

C. hyperborea Lec. My only information regarding this insect comes from Professor F. L. Washburn of Eugene, Oregon. He took it commonly on the Oregon coast during the summer months. It flies along the beach, running over both wet and dry sand and is said to be very wary. The observations above recorded were made chiefly in Lincoln County during July and August. Dr. LeConte's original specimens came from Methy Portage in the Hudson's Bay Region. The form *limbata* Say, seems to be confined to the sand hill country of Nebraska. Professor Bruner found it in "blow-outs" where there was little or no vegetation. It is less active than many other sand-frequenting species not running nor flying so readily.

C. ancocisconensis Harris. For the following careful account of the habits of this species I am indebted to Mr. Ottomar Reinecke of Buffalo, New York:—"It is found only at one spot in the vicinity of Buffalo, a strip on the banks of Cazenovia Creek, eight miles from the city. The locality is about one mile in length and from an eighth to a half mile in width, on both sides of the creek. It is protected on the southwest by a bluff, sheltering it from the cold western winds. The soil is bottom lands, the deposits from near-by shale, sand and black mud. The *Cicindela* comes out of the ground during the first bright days of May and can be found until the middle of June. A second brood appears in August. On warm sunny days it is very wild, on cloudy days is sluggish and may then be found concealed under stones, twigs and boards. On such occasions I have dug it out of the banks of the creek. They are easily recognized during flight by an experienced collector on account of their large size and the bright metallic green of the underside. Several other species — *C. repanda, purpurea, sexguttata* and *punctulata* are more or less numerous in the same locality." Mr. Roland Hayward has taken it on rocky, wooded, mountainous country, alone or scattered along roads. His localities

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are Underhill, Vermont, Mansfield (two specimens, August), "Glen" to Jackson, N. H., 1000 to 1500 feet, July 2. Dr. T. W. Harris, in his published Entomological Correspondence, speaks of its being found only near the water. In regard to this remark I have the following note from Mr. Edw. D. Harris:—"I remember well his discovery of *ancocisconensis* and am puzzled by this allusion to the water, for he took it first at North Conway in the White Mountains, and the only waters there are the small running streams of the woods and hills."

C. vulgaris Say. Seems to be most abundant along sandy strips, rather near water, though not necessarily close to the brink. At Denver, Colorado, I have often seen it in abundance along irrigating ditches which had overflowed on to the surrounding flats. At Iowa City I find it only in company with *lecontei*, while at Bayfield, Wisconsin, it was pretty generally distributed along the more open sandy roads. The variety called *obliquata* Kirby, in which the markings are very broad, I once met with in numbers during the month of June, on a flat sandy area at Coolidge, New Mexico, where the ground was partially overgrown with weeds. The Californian variety *vibex* Horn, is said by Mr. Fall to occur on ocean beaches, rarely he thinks. Mr. W. G. Wright has taken it in quantity near San Bernardino, California.

C. repanda Dej. A fluviatile species, most abundant on the banks and bars of rivers, streams and lakes. *C. oregona* Lec., the western form, has the same habits as the type, and like it, seems to fly throughout the warm months of the year. Mr. Fall writes:—"*Oregona* is common inland (in California) wherever there is moisture. I have taken it from March to October and it is probably at large throughout the year. Usually occurs in small swarms and is quite wary." *C. 12-guttata* Dej., another spotted form, has been said to be fond of very wet spots in marshes and the like. Dr. Blaisdell writes, regarding this variety, "Found alone or evenly scattered on dark sand and mud, in moist roads or on the banks of ponds, lakes and streams in San Diego and Calaveras Counties." The remaining form, *guttifera* Lec., has been taken near Phoenix, Arizona, by Dr. H. G. Griffith, who writes that it is to be seen in small numbers, unmixed with any other species, on wet sandy places along banks of rivers (Rio Verde, April 4 to 12). It is very shy and hard to capture. A few have been taken at electric lights in Phoenix during the month of June. Dr. Blaisdell tells me that it occurs during March and April near the Col-

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orado River in eastern San Diego County on dark sand or ordinary soil by ponds and rivers. It is scattered and moderately shy.

C. pusilla Say. Apparently very rare. Schaupp notes its occurrence on moist mud in the Platte and other river valleys. *C. terricola* Say, was taken by the expedition from the California Academy of Science at San Pedro Martir and Sierra el Chinche, Baja California, in September and October.

C. hirticollis Say. Has much the same habits as *repanda* but is less commonly found in the interior. On the Atlantic beaches it is common. It is also to be had in less profusion along the shores of the great lakes and about the banks of smaller bodies of water, lakes or rivers. At Iowa City I took a few in August on a sand bar in the Iowa River. In California it has been taken by Mr. Fall along the Colorado River during July, and on Long Beach in August. Dr. Blaisdell took it at San Diego and in San Francisco County in April, flying in company with *latesignata* and *gabbii*. He noticed it chiefly on dark muddy shores along ocean and bay beaches or on the near-by flats. White sand was less productive.

C. cinctipennis Lec. It is said to occur "on muddy plains near rivers." I took a lot of the green form on the muddy flats bordering the Little Colorado River at Winslow, Arizona, in July. But the brown form seems to have different habits, since I got it in abundance along a sandy road running through a grove near Buena Vista, Colorado, in July It is only moderately shy. Mr. Roland Hayward also found this brown form on the Placerville road, Horsefly Peak Divide, San Miguel County, Colorado, July 13. It occurred in swarms but not intermixed with other species. "From memory only," he writes, "I should say the soil was sandy, the country mountainous and rather thinly wooded or grassy. The beetles occurred along the road and near springs." The western variety, *imperfecta* Lec., is abundant locally at various points in Idaho, Oregon and Washington. I once came across it in numbers, early in June, along the banks of a creek near The Dalles, Oregon.

C. lunalonga Schaupp. The type is from Sierra County, California. So I am told by Mr. Chas. Fuchs who has the specimen in his collection. It was taken in July.

C. rectilatera Chaud. Abundant on river bars and sandy banks in southern Texas. I have taken great numbers at Columbus and Hous-

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ton and noticed it swarming about road pools between Alice and Brownsville, June and July. It is quite easily captured. I have very seldom seen any tiger beetle in such great swarms as this.

C. tenuisignata Lec. I have found it commonly on muddy banks of pools during July, in the vicinity of the Colorado River at The Needles, California. It was also taken rarely at Columbus, Texas, in company with *rectilatera* and *sperata*.

C. punctulata Fabr. Chiefly taken on dry ground. I find it most abundant in roads through loamy soil where the color harmonizes with the surroundings. Still it often occurs on dry sand, in the same localities frequented by *generosa* and *lecontei*, while in Colorado it is abundant on city lots in Denver during the month of July. It is said by Schaupp to be common "in the streets of some of our large cities." *C. micans* Fabr., the western type, runs closely into *punctulata*, both in color and habits. Often both forms occur together, running in the bright sunshine over bared spots (as at Colorado Springs) in pastures or along roadsides during June, July and August. Nearly dried beds of rain-pools seem to be favorite situations for *micans* in the arid regions. In Arizona and New Mexico I often saw it by the sides of the railroad tracks. Prof. Townsend took it at Las Cruces (June and July) and Zuni (July 29), New Mexico, on bare sand or soil, occasionally amongst weeds. It is quite shy and flies very readily. In Iowa I have found *punctulata* at electric lights.

C. tortuosa, Dej. This species occurs on muddy banks or flats, especially if saline, and along the sea shore. It is the commonest tiger on the sand beaches of the Bahama Islands, but seemed rarer at Key West. If the beaches are muddy, thus unfitting them for *dorsalis*, that species is often found to be replaced by *tortuosa*. Mr. Soltau found it on muddy creek-banks near Mobile, Alabama, and on the shores of Lake Pontchartrain, Louisiana. The Californian variety, *sigmoidea* Lec., has been seen in thousands by Mr. Fall on ocean beaches of the southern part of the state during August. Dr. Blaisdell took it commonly on dark sand and mud of bays, sometimes in company with *hæmorrhagica* and *hirticollis*, at San Diego.

C. dorsalis Fabr. Mr. Kemp finds it in great abundance "along the ocean front along the New Jersey coast. It inhabits the sand beaches from the tide line down to the edge of the water, whether high or low tide, during the heat of the day. It never gets far enough

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away from the tide line to occur in company with *C. lepida*." I am not aware of the northern limit of range, but to the southward it is replaced in Florida by the form *media* Lec., which I have from Lake Worth, where it was taken by Dr. John Hamilton. The Texas beaches often swarm in July with the small variety *saulcyi* Guér. I have taken it in plenty on the open tracks of fine white sand at Galveston and in less numbers on Padre Island, off the mouth of the Rio Grande. It seems to avoid muddy stretches and is moderately difficult of capture.

C. hamata Brullé. "Occurs on the seashore of Louisiana, Texas and Florida" (Schaupp). Said to be common in June at Cedar Keys. Mr. Soltau has taken it on Deer Island, about two miles out in the Gulf, off Ocean Springs, Mississippi, hunting around close to the water's edge in August.

C. marginata Fabr. I took this on the beach at Key West, while Mr. Schwarz records it from seashore and lagoon beaches in April (rare) and June (common) at New Smyrna, Fort Capron and Cedar Keys, Florida. Mr. Kemp finds it on mud flats along the New Jersey coast, near Anglesea and Avalon, during July. He takes it in greatest abundance on hot days, on moist, bare patches of mud or black sand. Easy enough to capture with a light net. Dr. Gould, in his paper on the "Cicindelæ of Massachusetts," writes of specimens from his state, they "inhabit barren patches of earth on salt marshes where the tide occasionally flows; when disturbed they betake themselves to the high grass which they sometimes climb to escape the rising tide instead of flying before its approach."

C. cuprascens Lec. Rather common in Kansas. Professor Popenoe found it in Reno, Riley, Mitchell and Shawnee Counties, on river beaches and bars. Mr. Knaus took it at Fredonia, on salt marsh, and writes that Mr. S. C. Mason found the species in great abundance on a sand-bar at the mouth of a small stream opening into the Solomon River (Kansas). He easily took a number without the aid of a net. The locality is saline.

C. puritana Horn. This species is taken by Mr. F. Knab on the shores of the Connecticut River, along sandy beaches. He finds it near Chicopee and Springfield, Massachusetts, rather sparingly, from June 20 to July 25. By its curious attitude — the body being held higher in front than usual — it may be distinguished from *C. repanda*,

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which inhabits like situations. It is quite shy and has been taken several times at electric lights.

C. macra Lec. In Kansas has been taken by Professor Popenoe, in the same localities and under the same conditions as *cuprascens*. In Iowa I have found it on river bars, especially when a thin coat of mud overlies the surface. It also appears occasionally on roads, July and August. Electric lights attract it very readily, in fact, I get most of my material at Iowa City by searching near the lights. The peculiar attitude noted under *puritana* is also shared by this insect.

C. wapleri Lec. Mr. Soltau took this species at Covington, Louisiana, "on the snow-white sand banks of a little stream which flows through a beautiful country covered with timber, mostly pine. Along the stream, however, there is plenty of other vegetation, oak, magnolia, sweet gum, holly and so on. I have taken the insects in May and June, never earlier nor later. All occurred in two spots only, though I traveled up and down the stream for a long distance. The beetles would dart around, more in the shade towards the sloping bank than close to the water's edge. They are less shy than some of the tigers."

C. blanda Dej. Said to occur on shores of rivers in Georgia and North Carolina.

C. sperata Lec. This beetle frequents river banks in the southwest. I took it in July at Columbus, Texas, on sand bars in the Colorado River. At Albuquerque, New Mexico, it came in numbers to electric lights during July. At Luna, a small station on the Atlantic and Pacific R. R., a few miles west of Albuquerque, I found it quite abundant on the shores of a little pond. The green, reddish cupreous and brownish forms were all swarming together. Mr. Roland Hayward took it at Aztec, Animas Valley, New Mexico, in July. Both the ordinary form and a greenish variety occurred on the muddy shores of a tributary to the Animas River. In California, Mr. Fall has found it rather plentifully along the sandy or muddy flats of the Colorado River in June and July. It was not very difficult of capture.

C. gabbii Horn. Dr. Blaisdell found it in August at San Diego, California, in August, on alkaline flats about sloughs near the bay, frequenting bare areas between patches of beach-berry and *Salicornia*. Often occurred with *latesignata* and *hirticollis*. Moderately shy. Mr. Fall says it is rare on Long Beach, while Mr. Dunn reports it from mud flats at Wilmington, California. Mr. Fall further remarks that so

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far as his experience goes, all the tigers of southern California are found in damp situations, none occurring along roads nor in dry fields.

C. hirtilabris Lec. Mr. Schwarz collected it in Florida where it occurs on sandy soil in pine woods or on sandy paths through meadows. June.

C. gratiosa Guér. Taken by Mr. Soltau, running over sand in the hills covered with scrub oak, at Spring Hill, a residence portion of Mobile, Alabama.

C. lepida Dej. Very widely distributed, but local and usually not abundant. Mr. Kemp takes it at Avalon and Piermont, New Jersey, on white sand hills along the coast, just beyond the tide line. He finds it mostly on hot sunny days in July, quite wary and difficult to see on account of its color so closely resembling that of the sand. Professor Popenoe takes it singly in dry, sandy river bottoms and fields, among grass and weeds, in Shawnee and Riley Counties, Kansas, during June and July. In Nebraska Professor Bruner found it restricted to the bare sand of "blow-outs" in the sand-hill country. At Iowa City it is occasionally found on a curious sand-flat a short distance north of town. It is readily attracted to lights. I have found it at street lamps in Iowa City and Albuquerque, New Mexico. Professor Snow has a lot collected under like conditions in Douglas County, Kansas. The most interesting experience of this sort, however, is that related to me by Professor W. H. Harshbarger, regarding his collecting the species in Topeka, Kansas. He writes: "I have taken about one hundred, mostly males, around the low arc lights in front of stores. I invariably found them at some distance from the lamp close to the wall. They seemed to shun the bright light and never got out on to the walk as do some others. The most fruitful place was just around a corner from a light, where they were in semi-darkness. Most of the captures were made in July and August, a few in June. They seemed sluggish and easy to take. I never caught one in daylight though I looked for them along the river and have collected over the entire region here."

C. lemniscata Lec. This is an active little species which I found rather commonly running and flying in hot sunshine by the sides of the Southern Pacific R. R. tracks near Tucson, Arizona, in August. It frequented nearly bare spots which had been more or less wetted by recent rains, but far from any permanent water supply. I also found

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it in similar situations at Luna, New Mexico, sometimes hiding under tufts of grass. Dr. H. G. Griffith took it at light in Phœnix from June to October, but never saw it by daylight. I also met with it in quantities at the street lights of Tucson. Professor Townsend took it September 25 on bare white sand on the lower Mesa, far from water, in the vicinity of Las Cruces, New Mexico.

C. circumpicta Laf. Mr. Knaus finds this species on salt marsh, in June, July and less commonly in August, in the vicinity of Fredonia, Kansas. It is commonest near the water's edge, where the bare saline ground is moist and warm, and in sheltered offshoots where the sun shines hottest. Professor Popenoe has found it in abundance on salty or alkaline clay lands on the prairies of Mitchell County, Kansas, in July. My own experience with it is limited, but I got a few at Point Isabel, Texas, near the mouth of the Rio Grande; it occurred on the open beach where the great salt marshes come down to the sea, and is a strong, rapid flyer. The form *prætextata* Lec., took once, at electric light in Albuquerque, New Mexico.

C. togata Laf. This is also a salt marsh species and is known from the "basin" at Lincoln, Nebraska, as well as from the alkaline or saline marshes of Kansas and Texas. In the last named state, I found it at various points between Brownsville and Point Isabel, always on saline flats, rarely close to the beach. It is a rather wary insect and a very rapid runner. Professor Popenoe takes it in company with *circumpicta*, but more rarely.

C. pamphila Lec. I met this in great numbers along the beach at Point Isabel, Texas, during June and the early part of July. It is not so partial to clean, white sand as is *saulcyi*, apparently preferring more dirty ground, where the great salt marshes open on to the sea. Not difficult of capture, though by no means slow.

G. severa Laf. Also found at Point Isabel in July, in company with *pamphila*. But it is a most extremely wary species, of very strong, swift flight, and was met with rarely. It presents a magnificent appearance when alive and flies in the hottest sunshine.

C. striga Lec. Unknown to me. Taken by Hubbard and Schwarz at night, when it was attracted by camp-fires at Lake Harney and Enterprise, Florida, in May. As this species is said to be extremely closely allied to *severa*, it is strange if they are really so diverse in habits as the note would seem to indicate. It is quite likely that the

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attraction by light was equivalent to that which is now well known in many truly diurnal tiger beetles, for example. *lepida*, *sperata* and *lemniscata*, and that it might have been found flying by daylight if the proper spot had been hit upon.

C. hæmorrhagica Lec. Dr. F. Blaisdell has found it at San Diego, California, in April and May, on dark sand or clay soils along the bay beach and on alkaline flats, running about between patches of maritime vegetation. It is shy. I took it once at Provo City, Utah, running along sandy roads in May. The form *pacifica* Schaupp, I took on a mud flat at Barstow, California, in August, while Dr. Blaisdell finds it at Del Mar in the same state. He writes: "It occurs on sand, white or dark, the latter preferably, both on the ocean beach and at Poway, fourteen miles from the coast, on the course of a creek emptying into the ocean. It is found alone, scattered and shy. The soil on the beach is bare, that along the creek grassy and weedy. At night the beetles repair to crevices in the cliffs which border the shore of the ocean. Schaupp, in his synopsis, states that *pacifica* 'has no markings at all,' which is a mistake, as I have taken a great many specimens with markings similar to *hæmorrhagica*, but of the characteristic color of *pacifica*." He further remarks concerning those California tiger beetles on which he furnished notes, "All are abundant in their season except *hæmorrhagica*, which has become quite rare about San Diego Bay beaches where they were common before the advances of civilization."

C. rufiventris Dej. This species is said to be abundant on the hills in Kentucky, opposite Cincinnati. The variety *cumatilis* Lec., was found by Mr. Soltau on muddy places in the woods by Oak Grove, Mobile, Alabama, in company with the type. The form 16-*punctata* Klug, I found in abundance on the shores of the Rio Grande at Albuquerque, New Mexico, flying about muddy flats. A single specimen was also taken by the margin of a small pond at Luna, twenty-two miles farther west. A variety of this species, apparently not described, has been taken in the Cañon of the Colorado River. I propose for it the name *arizonæ*, with the following characteristics: Form of 16-*punctata*, reddish bronze above, with greenish reflections which are more pronounced on the head. Elytra with complete humeral lunule, median band not or very slightly extended along the margin, obliquely bent, not much narrowed at any part. A small post-median lateral dot is present. The apical lunule is complete, but there is a tendency,

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quite well defined, to a separation of the anterior portion in the form of a dot. Under side of body bronzed with green and golden reflections, trochanters and abdomen reddish, legs cuprous. Length, 11 mm. Compared with a male 16-*punctata* from Luna, New Mexico, *arizonæ* has the head rather more distinctly rugose, the elytral sculpture a trifle coarser, while the sutural spine and the serration of the elytral apices are much better marked. The labrum is formed exactly as in 16-*punctata*. Both pairs of palpi are pale at base in my specimens, which are males. Mr. Roland Hayward sent me specimens labelled "Grand Cañon of the Colorado" and I have since received the same thing collected by Professor Townsend, who writes: "I collected the species in the Grand Cañon during the first two weeks of July, 1892. It occurred on sandy places or along paths by a stream going down a side cañon, from 2500 feet above, down to the level of the Colorado River. Or from 5000 feet above sea (at Hance's stone cabin, 2500 feet below the rim and about two or two and a half miles down the trail from river) quite to the bottom of the cañon, which is here 2500 feet above the sea. The insect is not especially wary."

C. hentzii Dej. Mr. Roland Hayward tells me that it is found on rocky, more or less wooded hillsides, usually sunning on bare rocks. It occurs alone and scattered. He cites several localities in eastern Massachusetts, i.e., Milton, Medford, Gloucester, Brookline, West Roxbury. It flies from June to August. Dr. A. A. Gould, in his "Cicindelæ of Massachusetts," writes: "This very interesting species was discovered by Dr. T. W. Harris on the summit of Blue Hill in Milton. It does not prefer the sand and the plain, but its habit is to bask on the broad flat masses of granite which rise above the soil, retiring to the patches of moss and lichen which vegetate in the crevices. When flying in the sunshine its crimson and nearly transparent abdomen appears like a drop of blood suspended to its tail."

C. marginipennis Dej. "On the banks of the Susquehanna below the bridge at Harrisburg; banks of the Delaware near Callicoon," (Schaupp). Mr. Nathan Reist informs me that he takes it on sandy soil or more or less on cobblestones on river bars at Marietta, Pennsylvania, from the middle of June to the first of September. It occurs in swarms but is difficult of capture on account of a peculiar habit. They are very watchful and stand on the round stones. As soon as the net falls over them, instead of flying up they run out from beneath, the inequalities produced by the pebbles keeping the net from lying flat.

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C. abdominalis Fabr. Said to occur on sandy paths in pine forests. Dr. Le Conte says on sand blackened by forest fires. Mr. Chas. Liebeck writes that during the last week in June ten or twelve specimens were seen between Hammonton and Da Costa, New Jersey. It frequents wagon roads through woods and does not confine itself to any one locality, those that were seen being scattered in ones and twos along the entire distance. Mr. Schaupp wrote that his *scabrosa* occurred with the type in Florida.

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NOTES ON GRASSES OF NEBRASKA, SOUTH DAKOTA AND WYOMING.

BY L. H. PAMMEL.

In two former papers the writer* has discussed the grasses of Colorado and Nebraska. In this paper I shall enumerate the grasses collected during the season of 1897. The grasses of Wyoming have been discussed in a general way by Tweedy,** F. Lamson-Scribner, and Frank Tweedy,*** Parry,*! Nelson,*!! Forwood,**! and Greene.***!

The forage conditions of the state have been discussed more especially by Williams† for Northern and Northeastern Wyoming, and the Red Desert Region of Southern Wyoming by Nelson.‡

The writer desires to acknowledge the assistance rendered him by Prof. F. Lamson-Scribner who kindly looked over the grasses collected on the trip.

*Notes on the Grasses and Forage Plants of Iowa, Nebraska and Colorado. Bull. U. S Dept of Agri. Div. of Agro. Washington. 9:47. *f. 1-12*. 1897.

*L. H. Pammel and F. Lamson-Scribner. Some Notes on Grasses Collected in 1895 Between Jefferson, Iowa, and Denver, Colorado. Proc. of Agrl. Sci., 17:94-104, 1896 (Contr. Bot Dept. Iowa Agrl. College. 3).

**Flora of the Yellowstone National Park. Washington. 69-74. 1886.

***Grasses of Yellowstone National Park Bot Gazette. 11:169-178.

*!Botanical Observations in Western Wyoming. Am. Nat., 8:9, 102, 175, 211. 1874.

*!!First Rept. on the Flora of Wyoming Bull. Wyoming Agrl. Exp. Sta., Laramie. 28:189-197. 1896.

**!Expedition Through the Big Horn Mountains, Yellowstone Park, etc. Rept. of Mr H. Forwood. Washington. 27-39. 1881.

***!Rambles of a Botanist in Wyoming Territory. Am. Nat. 8:31-34, 208-211.

†A Report Upon the Grasses and Forage Plants and Forage Conditions of the Eastern Rocky Mountain Region. Bull. U. S Dept. of Agrl., Div. Agro. Washington. 12:78. *f. 1-30*. 1898.

‡The Red Desert of Wyoming and Its Forage Resources. Bull. U. S Dept. of Agrl. Div of Agro. Washington. 13-72. *pl. 1-5, f. 1-24*. 1898.

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ITINERARY.

It will not be necessary to refer at length to the stops made at Alma, Oxford, or Hastings, all in Nebraska. Grand Island, Nebraska, was reached on the 23rd of June and the day was spent collecting, chiefly along the Platte River. New Castle, Wyoming, was reached on the 24th. At Sheridan, Wyoming, on the 26th, I was joined by Mr. E. M. Stanton. The remainder of the day was spent collecting in and about Sheridan. On the 27th, in company with Mr. Stanton and J. V. Crone, we started with camping outfit for Dome Lake in the Big Horn Mountains. The night of the 27th we camped on Dome Lake Road near a spring at an altitude of 5,500 feet. The road proved excellent as it is much traveled by those who are interested in the summer resort at Dome Lake. We reached Rapid Creek Park by 12 M. on the 28th at an altitude of 7,500 feet, and Dome Lake in the evening of the same day, altitude of 9,200 feet. We camped in the vicinity of Dome Lake for two days collecting in the vicinity of the lake and mountain. On June 30th we made a detour to the west branch of the Big Goose on the road to Shoshone Basin. This proved a most excellent place for collecting. We returned to Sheridan on July 3rd. On July 4th and 5th some time was spent collecting in the vicinity of Sheridan. On July 7th the writer spent a day collecting at Broken Bow, Nebraska. A few grasses were also obtained at Ravenna, the same state, where the train stopped for half an hour.

TOPOGRAPHICAL FEATURES AND ECOLOGICAL NOTES.

The flood plains of the Platte River in and about Grand Island are admirably adapted for grazing purposes. The wide flood plain of the river makes it evident that the stream once carried large bodies of water from the adjacent prairies and the mountains beyond the plains. It now carries large bodies from the spring freshets. The fact that such water comes from the adjacent hills indicates that it must bring with it large quantities of loose and very excellent soil. The soil is of a sandy loamy nature and along the river edges of the flood plain, plants have easy access to moisture. The adjacent hills are cut by small valleys. Through Box Butte and Dawes counties the country is more broken and the western pine, *Pinus ponderosa* var. *scopulorum*, makes its appearance. This ruggedness is much more pronounced in

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Fall River County, South Dakota. In the vicinity of Edgemont the elevation is 3,415 feet and higher hills 3,550. Many of the hills are nearly denuded except an occasional *Pinus ponderosa* var. *scopulorum*. On the dry sterile hills *Stipa comata* and *Koeleria cristata* are abundant. The small, narrow valleys contain an abundance of *Agropyron spicatum*. Edgemont marks the southeastern portion of the Black Hills range. Between Edgemont and New Castle, on the western slope of the range, there is a continuous rise. At the latter point the elevation is 4,019 feet. The coniferous woods contain mostly the *Pinus ponderosa* var. *scopulorum*. The green of the leaves is in strong contrast with the soil which is covered by minute particles of a black shale. The hills are extremely rugged and are traversed by small and narrow cañons. In the coniferous woods such grasses as *Koeleria cristata*, *Poa Buckleyana Oryzopsis micrantha*, are common. The *Agropyron spicatum* and *Bouteloua oligostachya* are common on the plains, affording excellent pasturage. In the cañons *Stipa viridula*, *Elymus condensatus* are common. These are associated with two species of *Symphoricarpos:* the *S. occidentalis* and *S. racemosus*.

Such hydrophytic plants as *Panicularia aquatica* and *P. nervata*, occur along the streams. One notes further, such eastern and northern plants as *Cystopteris fragilis*, *Galium aparine* and *Rubus strigosus* in the woods.

From New Castle to Gillette there is a gradual incline. The elevation at Gillette is 4,520 feet, one of the highest points along the division of the road. The country is extremely broken, consisting of low ranges intersected by narrow cañons. In the distance from Moorcroft the famous Devil's Tower may be seen. The *Pinus ponderosa* var. *scopulorum* becomes less numerous. As we left Jerome, and at Moorcroft, it seemed to disappear except an occasional pine on some hill. The hills seemed sterile and afforded but a scant growth. The *Artemisia tridentata* on the higher points and *A. longifolia* in the valleys are conspicuous plants of the region. The *Agropyron spicatum* and *Bouteloua oligostachya* were common about Gillette. Another grass which we had seen quite common at Edgemont and New Castle appeared to thrive on the dry plateau, namely, *Hordeum caespitosum*. From Gillette to Sheridan the country retained much the same character, the same red clay deposits with long ranges of low hills intersected by cañons. These hills are much subject to washing at some seasons and are nearly devoid of vegetation. Between

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Lariat and Arvada the Powder River is crossed. The water is of a reddish color from the suspended matter taken from the surrounding country. The valley is fairly fertile and some most productive fields of grass occur. Along Clear Creek there is excellent grazing. The river has its source in the Big Horn Range. In the irrigated fields of this region there were splendid fields of alfalfa and timothy. *Elymus condensatus* grew abundantly in the flood plains. One could also see, here and there, a purple spiraea—*S. Douglasii.* Sheridan has an elevation of 3,712 feet and is situated in the flood plain of the Big and Little Goose Rivers. These streams, fed by snow from Clouds and other peaks in the Big Horn Range, carry a good flow of water during the entire year. Many fine farms under irrigation are found in these valleys. In close proximity to the streams such shrubs as *Shepherdia argentea, Fraxinus viridis, Negundo aceroides,* abound. On these open flats we noted *Cnicus undulatus* var. *canescuns, Lepachys columnaris* in abundance. In the moister, natural meadows, *Beckmannia erucaeformis, Bromus breviaristatus, B. Pumpellianus, Agrostis alba,* and *Phleum pratense* occur. The adjacent hills are extremely dry, but here *Agropyron spicatum, Koeleria cristata,* and *Delphinium azureum* occur.

Farther up the stream the timber was more abundant. We noted the common occurrence of *Populus angustifolia, Prunus Americana, Crataegus Douglasii.* In the rich shaded woods *Dodecatheon Meadia, Allium brevistylum, Brunella vulgaris* and *Monarda fistulosa* are found. The latter was not absent in and about Sheridan but at an altitude of 4,500 feet the flowers were deeply colored. Of the grasses, mention may be made of such hydrophytic species as *Phalaris arundinacea, Phragmitis vulgaris, Panicularia nervata,* and *Beckmannia erucaeformis.* The *Elymus condensatus,* large and vigorous specimens along the roadsides.

In the foot-hills there was an appreciable change in the character of the vegetation. The country is marked by extremely precipitous bluffs. The archaean ledges in many cases are several hundred feet high. The foot-hills along the Dome Lake road are marked by coniferous and deciduous forests. The soil is a rich, tenacious red loam with outcrops of limestone. The lower belt of timber is made up of *Pinus ponderosa* var. *scopulorum* and *Pseudotsuga Douglasii* which was abundant in some places. *Thermopsis montana, Lupinus argophyllus, Campanula rotundifolia* grow in the open and denuded places. Here too *Agropyron spicatum* and *Koeleria cristata* grow in quantities. The

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wooded areas are marked by a fine growth of *Stipa Columbiana*, *Festuca Kingii*, and *Melica subulata*. The highest points of these hills are covered with *Pinus flexilis*, *P. Murrayana*, and on the limestone outcrops *Juniperus virginiana*. One of the most striking features of the region are the large parks — the paradise of the ranchmen. *Festuca nevadensis*, *Elymus glaucus*, *Stipa Columbiana* and *S. Nelsoni* grow abundantly. One of the most striking features of the first park on the Dome Lake road are the Geraniums. Acres and acres are covered with *Geranium Fremontii* and *Polygonium bistorta*. Much of the region beyond as far as Rapid Creek is covered with *Pinus Murrayana*. Large areas here have never been burned and consist of magnificent forests of this species.

In the Rapid Creek region a fine series of parks prevail, with narrow cañons leading into the adjacent mountains. The most abundant grasses of the park region are *Festuca rubra*, *Koeleria cristata*, *Agropyron spicatum* var. *molle*. In moister places the *A. pseudo-repens* is found. The narrow cañons are mostly boggy in their character. Here the Engelmann Spruce (*Picea Engelmanni*) is accompanied by such plants as *Moneses uniflora*, *Pyrola rotundifolia*, and *Heuchera pentandra*. Such grasses as *Poa leptocoma*, *P. Wheeleri*, *P. arctica*, species that have become habituated to the cold conditions prevailing in these bogs, occur. Aside from these cold bogs there are numerous wet marshes near the stream which are devoid of trees and shrubs. Here may be found *Savastana odorata*, *Dodecatheon Meadia*, *Allium schoenoprasum*, *Thalictrum sparsiflorum*, *Myosotis sylvatica* var. *alpestris*, and along the edge of the stream *Mertensia sibirica*. The Dome Lake region, with an altitude of from 8,800 to 9,500, is chiefly characterized by the numerous moraines. Here are to be found the characteristic rounded boulders of all sizes. One is agreeably surprised when the moraines are ascended to find a lake or a pond on the other side, nearly all without outlets. These lakes vary considerably in size; some are less than an acre in extent, others of considerable size as Dome Lake, which is partially artificial. These lakes occur without reference to the drainage of the streams in their proximity. In one instance a lake less than an acre in extent occurred near the very edge of the Goose River, one hundred and fifty feet above. The plant atoll may here be studied in all phases of its development. One of the most picturesque scenes in the entire region is the deep cut made through the archaean rocks and moraine, where a branch of the Goose

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finds its way to the West Branch. The moraines often have their peculiar plants. The soil is extremely dry on the surface and we find here such grasses as *Poa nemoralis*, *P. Buckleyana*, *Festuca ovina*, *Sedum stenopetalum*, *Antennaria dioica* and *Draba streptocarpa*. Close to the moraine are large flats where there is considerable moisture. Here *Savastana odorata*, *Viola palustris*, *Mertensia sibirica*, *Phleum alpinum*, *Deschampsia caespitosa*, and *Potentilla fruticosa*, *Kalmia glauca* var. *microphylla* grow in great quantities. On the shaded side of these moraines considerable snow still remained on the first of July; here we found *Kalmia glauca* var. *microphylla*, and *Viola palustris*.

The predominating tree at this elevatian is *Pinus Murrayana*. The Engelmann Spruce occurs only in the cañons, and here too we again find *Poa Wheeleri*, and *Phleum alpinum* is one of the most common grasses in such places. Elk Mountain, with an approximate elevation of 11,000 feet, contains the usual alpine plants. The timber line begins at about 10,500 feet. Just below it the Engelmann Spruce forms a belt of timber. Of the grasses we may enumerate: *Poa Suksdorfii*, *P. Fendleriana* in dry open woods, elevation 10,000 feet, *P. rupestris*, *P. Wheeleri*. Associated with these plants we note *Douglasia montana*, *Silene acaulis*, *Primula Parryi*, *Dryas octopetala*, *Trollius laxus*, and *Mertensia alpina*. It is interesting to observe that some western representatives reach the eastern borders of the Rocky Mountains.

VARIATION AS TO ALTITUDINAL DISTRIBUTION.

Altitude is an important factor in the distribution of plants. It has long been recognized that animals and plants are not universally distributed over the earth's surface but follow certain lines, as C. Hart Merriam* says: "Which lines indicate a change in temperature uncongenial to the species. * * * The temperature selected as probably fixing the limit of northward distribution is the sum of effective heat for the entire season of growth and reproduction, for it has been proved experimentally and long recognized by phenologists that many species of plants require a definite sum total of heat in order to successfully perform the several vital functions of leafing, blossoming and fruiting, and that such plants cannot mature their seed until a particular sum of heat is attained." Merriam holds that the geographic distribution of animals and plants may be expressed as follows:

* The Geological Distribution of Animals and Plants in North America. Year Book, U. S. Dept. of Agriculture, 1894:211.

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"In northward distribution terrestrial animals and plants are restricted by the sum of the positive temperatures for the entire season of growth and reproduction.

"In southward distribution they are restricted by the mean temperature of a brief period during the hottest part of the year."

These principles cover the fundamental facts.

Some species have adapted themselves to a wider range than others. This is shown very nicely in such species as *Festuca ovina*, which occurs at an altitude varying from 4,500 to 10,000 feet. We note, however, that soil has an important bearing on its distribution. *Agropyron spicatum* is perfectly at home on the plains of Nebraska and adjacent foot-hills of the Big Horn Mountains, but at an altitude of 7,500 feet it is not so common. Here it has nearly reached its altitudinal limit of distribution. Its occurrence in and about Rapid Creek Park on dry slopes is not peculiar since the sunny sides of the parks receive an intense heat during the day. The soil is dry and this accounts for its full development. The *Poa Buckleyana* seemingly has a considerable range of altitude. Its occurrence at New Castle at an altitude of 4,019 feet is not strange, for many of the plants of this interesting region are northern. The nights are cool and the timber has greatly modified the excessive heat of the adjacent plains. At Dome Lake, 9,200 feet, this species occurs on the moraines. The soil, as I have said elsewhere, is of a gravelly nature, the surface being very dry. The *Agropyron tenerum* is not only common at Hastings, Nebraska, altitude 1,943, Grand Island, 1,872, and Broken Bow, 2,488, but along the irrigation ditches and streams at an altitude somewhat less than 5,000 feet. The *A. pseudo-repens* has a wider distribution. It is not uncommon in the prairie states, Iowa, Colorado and Nebraska. It occurs not only at Broken Bow at 2,480 feet, but in the grassy parks at 5,500, and 8,500 feet of the Big Horn Range. But moisture is the factor which determines its distribution at a lower altitude. A more interesting case of the influence of moisture on the distribution of species is to be found in some of the species of *Poa* collected on the trip, namely, *Poa arctica* and *P. Wheeleri*. The altitude of *P. arctica* is 7,500 feet, not, however, in connection with *Savastana odorata*, which is abundant in the open, wet, grassy meadows, but with *Poa Wheeleri* and *P. leptocoma* in the cold spagnaceous swamps and cañons where the Engelmann Spruce occurs. In Northern Colorado the writer*

* L. H. Pammel, lc. Bull. Div. of Agros. 7:41.

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found the same species at the edge of a snow bank, altitude 10,000 feet, and along a deep cañon in which the Engelmann Spruce occurred and mosses characteristic of those swamps, at an altitude of 9,000 feet. Here the water comes from the melting snow of the mountains, but the water held in these mossy swamps is ice cold. So, too, the water in the Engelmann Spruce swamp in Rapid Creek Park, though not coming from snow banks in the mountains, was cold. This *Poa* is a sub-arctic plant which has found a congenial home in these sub-arctic cañons that radiate from the mountains. The *Poa Wheeleri* may be placed in the same category. The *P. Suksdorfii* has apparently a narrower altitudinal distribution. It is quite important to take into consideration altitudinal distribution as well as the nature of the soil. In comparing notes for the season of 1896 and 1897 it is interesting to observe that some of the species occur at nearly the same altitude. A few cases are here appended, including Fort Collins, Colorado, and Sheridan, Wyoming.

SPECIES.	MEDICINE BOW RANGE, AND FOOT-HILLS, N. COLO.	BIG HORN RANGE, AND FOOT-HILLS, WYOMING.
Beckmannia erucaeformis....	4,980—	3,715— 4,000
Bouteloua oligostachya	21,980— 7,800	3,715— 4,000
Calamagrostis purpurascens.	10,000—11,000	10,000—
Deschampsia caespitosa.....	7,775—11,000	7,500-- 9,500
Festuca Kingii.....	8,700— 9,500	5,500— 7,800
Koeleria cristata.....	5,000— 7,775	3,730— 7,500
Phleum alpinum.....	8,300—10,000	7,500— 9,500
Phleum pratense.....	4,950—10,500	3,715— 6,600
Poa arctica.....	9,500—10,000	7,500—
Poa Buckleyana	9,100—	7,500— 9,200
Poa Fendleriana.....	8,500—10,500	10,000—
Poa nemoralis	7,500— 9,500	5,500—10,000
Poa rupestris	9,000—10,000	9,500—10,500
Poa Wheeleri.....	9,100—	
Savastana odorata	8,500—	7,500— 9,200
Stipa viridula	4,978— 5,000	3,715—
Trisetum subspicatum	10,500—11,200	6,500— 9,200

This table seems to indicate that the same species occur at a much lower altitude in Wyoming than in Northern Colorado, a fact borne out by other plants found in this region. Some exceptions occur as *Koeleria cristata* and *Bouteloua oligostachya*. The plain surrounding Sheridan is much lower than Fort Collins. The descent towards the Medicine Bow Range is much more gradual than in the Big Horn. From the base of the Big Horn foot-hills in Sheridan County, in the

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vicinity of Big Horn, a steep incline occurs. At the edge of this timbered area some sub-arctic plants occur and a very large percentage of these species are boreal. As an instance, *Pinus flexilis* may be cited. In Northern Colorado this forms a distinct zone between 10,000 to 11,000 feet, but in Sheridan County it occurs at about 6,000 feet.

WEEDY GRASSES OF THIS REGION.

There are few weedy species. The most common weedy grass is Squirrel-tail grass. Two species occur; the weedy species of Nebraska is *Hordeum jubatum* which, as elsewhere, especially east of the Missouri, comes up in great quantities. In South Dakota, in the vicinity of Edgemont, and in Wyoming, about New Castle, Gillette, and Sheridan, the prevailing species is *H. caespitosum*, although *H. jubatum* is not absent. It is evidently a species well adapted to dry situations but grows more luxuriantly along irrigation ditches. The ever-common Foxtails (*Chaetochloa glauca* and *C. viridis*) are abundant in Nebraska. The *Hordeum pusillum* is an injurious intruder in Nebraska.

LIST OF GRASSES COLLECTED.

PANICEÆ.*

Panicum atlanticum Nash. Open prairies. No. 168. Hastings, altitude 1,943.

P. capillare Linn. Broken Bow, altitude 2,478. Everywhere in fields. No. 168.

P. Crus-galli Linn. Hastings, altitude 1,943. Low grounds, common. No. 22.

P. Scribnerianum Nash. Alma, altitude 1,950. Open prairies, common. No. 23.

Chaetochloa viridis Scribner. Broken Bow, altitude 2,478. A common weed everywhere in fields. No. 74. At Grand Island, everywhere a common weed in fields, along railroads and in streets. No. 18. It was commonly observed at other points, Alma, Aurora, and Ravenna.

Cenchrus tribuloides Linn. Broken Bow, altitude 2,450. Sandy soil, common in streets and sandy flood plains of streams. No. 151. Commonly, also, observed at Grand Island.

* The numbers following the locality refer to distribution of plants of Nebraska, South Dakota, and Wyoming. Distributed by the Iowa State College of Agriculture and Mechanic Arts.

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PHALARIDEÆ.

Phalaris arundinacea Linn. Grand Island, altitude 1,872. Common in alluvial flood plains of Platte River. A valuable early grass. No. 25. Big Horn, Sheridan County. Common also in low grounds, Goose Creek, No. 24.

Savastana odorata Scribner. Dome Lake, Sheridan County, altitude 9,200. Abundant on flats in vicinity of moraines, forming in many instances a fine turf. No. 83. Rapid Creek, Sheridan County, altitude 7,500. Low marshy ground. No. 82.

AGROSTIDEÆ.

Aristida fasciculata Torr. Alma, altitude 1,950. Common on prairies, dry hills and flats. No. 32. Grand Island, altitude 1,872. Dry sandy soil and hills. No. 185. Broken Bow, altitude 2,480. Dry hills, common. No. 33. New Castle, altitude 4,019. Common on dry hills. No. 31.

Stipa comata Trin. and Rupr. Edgemont, altitude 3,415. Common on dry hills. No. 1. New Castle, altitude 4,019, Mostly small plants, dry sterile hills. No. 2. Sheridan, altitude 3,729. Dry hills, common. No. 160.

S. Columbiana Macoun. Along the edges of the timber, and in the Parks, Sheridan County. Above Big Horn on Dome Lake Road, altitude 5,500 to 7,000. A large and beautiful grass. No. 193.

S. Nelsoni Scribner. Sheridan County above Big Horn, Dome Lake Road and in Geranium Park, altitude 7,500. A handsome species. No. 194.

S. viridula Trin. Alma, altitude 1,750. Common, prairies and flood plains of Republican River. No. 16. New Castle, altitude 4,019. Common along roadsides and in cañons. No. 3. Sheridan Road, altitude 3,712. In flood plains of Little and Big Goose Rivers, common. No. 4.

Eriocoma cuspidata Nutt. New Castle, altitude 4,019. Dry sterile soils. No. 66.

Oryzopsis asperifolia Michx. West branch of the Big Goose River, and on the road to Sheridan, altitude 8,500. In open woods. No. 72.

O. exigua Thurber. Dome Lake, Sheridan County, altitude 9,500. No. 92*a*.

O. micrantha Thurber. New Castle, altitude 4,050. Dry woods. No. 147, No. 88.

Phleum alpinum Linn. The species grows in wet marshy places, forming a fine turf. No. 12. Sheridan County, Big Goose, altitude 8,500. In low, wet places. No. 10. On road to Shoshone Basin, No. 162.

Phleum alpinum var. *Scribnerianum* Pammel. Culms 5-6 dm. high, the lower leaves 10-25 cm. long; spikes 3-4 cm. long. Spikelets, including the awns of the empty glumes, nearly 6 mm. long. This variety differs from the species in its larger and more robust habit of growth. It forms compact masses and grows in rather dry red clay soil. Sheridan County, Wyoming, Geran-

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ium Park, altitude 7,500. No. 6. L. H. Pammel, July 1, 1897. Named in honor of the distinguished agrostologist.

Phleum pratense Linn. Hastings, altitude 1,943. Meadows common near the pump-house. No. 13. Aurora, altitude 1,803, streets. No. 5. Broken Bow, altitude 2,748. Meadows near New Castle in cañons. No. 8, No. 9. Big Horn, Sheridan County, altitude 4,000. In irrigated fields a most excellent grass. No. 11. Sheridan County above Big Horn, altitude 6,600. Along Dome Lake Road, undoubtedly introduced by horses and travelers. No. 7.

Alopecurus geniculatus Linn. Sheridan, altitude 3,712. No. 197.

Sporobolus cryptandrus A. Gray. Grand Island, altitude 1,872. Prairies and along roadsides. Common in sandy soil. No. 12. Broken Bow, altitude 2,488. Sandy soil. No. 19. Ravenna, altitude 2,008. Common in sandy soil near station. No. 20.

Agrostis alba Linn. Grand Island, altitude 1,865. Common along Platte River, flood plains. No. 35. Hastings, altitude 1,943. Common near pump-house. No. 93. Sheridan, altitude 3,712. Common in flood plains of Big and Little Goose Rivers and in the vicinity of irrigation ditches. No. 34.

Agrostis scabra Willd. Hastings, altitude 1,943. Common on prairies. No. 37. Oxford, altitude 2,085. Common on prairies. No. 36. Sheridan, altitude 3,712. No. 209.

Calamagrostis canadensis L. var. Sheridan County, west branch Big Goose near the road to Shoshone Basin, altitude 8,500. Low grounds, forming a turf. No. 41.

C. hyperborea L. New Castle, altitude 4,019. In cañons. No. 40, No. 204.

C. purpurascens R. Br. Dome Lake, Sheridan County, altitude 10,000. No. 171.

Calamovilfa longifolia Scribner. Ravenna, altitude 2,008. Common in sandy soil. An excellent soil-binder. No. 65.

AVENEÆ.

Deschampsia caespitosa Beauv. Sheridan County, Rapid Creek Park, altitude 7,500. Common in moist meadows. No. 90. Sheridan County, Dome Lake, altitude 9,200. Moraines, common. No. 79. Dome Lake, altitude 9,200. Common in open timber. No. 91.

D. caespitosa Beauv., var. *pilosa* Beauv. Dome Lake, Sheridan County, altitude 9,500. Common. No. 100*a*.

Trisetum subspicatum Beauv. Sheridan County, above Big Horn, altitude 6,500. Dry sterile hills and in pine woods. No. 176. Rapid Creek Park, Sheridan County, altitude 7,000. Common in pine woods and dry hills. No. 179. Dome Lake, Sheridan County, altitude 9,200-10,000. In dry *Pinus Murrayana* woods, moraines. No. 180.

T. subspicatum Beauv., var. *molle* Gray. Sheridan County, and west branch of Big Goose on road towards Shoshone Basin. Common in *Pinus Murrayana* woods. No. 99.

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CHLORIDEÆ.

Schedonnardus paniculatus Trelease. Oxford, altitude 2,085. Common, dry prairies, No. 163; Alma, altitude 1,950, similar places. No. 15. Hastings, altitude 1,943. No. 16. Broken Bow, altitude 2,488. No. 14.

Boutelona oligostachya Torr. Alma, altitude 1,950. Common. Blue Grama is one of the most valuable grasses found on the plains. No. 29. Sheridan, altitude 3,712. No. 207.

Beckmannia erucaeformis Host. Sheridan, altitude 3,712. Common, flood plains of Little and Big Goose Rivers, and along irrigation ditches. A valuable grass. No. 30.

Bulbilis dactyloides Raf. Broken Bow, altitude 2,475. Not uncommon on hills and flood plains of streams. No. 68*a*.

FESTUCEÆ.

Munroa squarrosa Torr. New Castle, altitude 4,019. Common on plains. No. 172.

Phragmites vulgaris B. S. P. Sheridan and Big Horn, altitude 3,700-4,500. In low standing water.

Eragrostis major Host. Aurora, altitude 1,803. Introduced and common in streets. No. 152. This species also abounds at Hastings, Alma and Grand Island.

Eatonia obtusata A. Gray. Alma, altitude 1,950. Common, flood plains of the Republican River. No. 38. Grand Island, altitude 1,872. Abundant, flood plains of the Platte River. No. 48, No. 95. Broken Bow, altitude 2,488. No. 89. Oxford, altitude 2,085. No. 167. Hastings, altitude 1,943. No. 39. Sheridan, altitude 3,712. No. 195.

E. Pennsylvanica A. Gray. Sheridan, altitude 3,712. Flood plains of Little and Big Goose Rivers. No. 173, No. 196. Big Horn, Sheridan County. No. 212. Along irrigation ditches, altitude 4,500. No. 117.

Koeleria cristata Pers. Alma, altitude 1,950; dry prairies. No. 73. Oxford, altitude 2,085. Hastings, altitude 1,943. No. 80. Grand Island, altitude 1,872. Also found at higher places. Flood plains of Platte River. No. 110 Broken Bow, altitude 2,478. No. 109. Sheridan, altitude 3,732. A low grass on dry prairies. No. 75. Sheridan County. Along Dome Lake Road near spring, altitude 5,500. Dry hillsides. No. 184. New Castle, altitude 4,019. Dry hills, common. No. 111. Sheridan County, Rapid Creek Park, altitude 7,500; on dry hills. No. 81.

Melica bulbosa Geyer. Dome Lake Road, Sheridan County, near spring, altitude 5,500, rich woods. No. 158.

M. spectabilis Scribn. Sheridan County. In localities similar to the last species and growing with it. Altitude 6,500. No. 71.

M. Pammellii Scribn. n. sp. A slender, erect perennial, 6-10 dm. high from a bulbous base with scabrous sheaths, narrow, elongated, flat leaves

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and loosely flowered, simple panicles 18-25 cm. long. Ligule hyaline, scarious, more or less erose, 3-3 mm. long; leaf-blade 10-30 cm. long, 5-10 mm. wide. Panicle-branches erect or ascending, flexuous, scabrous. Spikelets 3-6 flowered, lanceolate or narrowly oblong, 12-18 mm. long; empty glumes unequal, oblong, lanceolate, obtuse or subacute, the first 6 mm. long, 3-nerved below; the second 8 mm. long and 5-nerved, with broad hyaline margins, scabrous on the nerves. The first flowering 9-10 mm. long, 9-nerved, oblong, lanceolate, acuminate, broadly scarious margined above; apex variable, acute, subacute, or occasionally 2-toothed, scabrous on the back, specially on the nerves, with a few flexuous hairs near the margins towards the base. Palea much shorter than the glume, more or less arcuate, 9-7 mm. long, densely ciliate, fringed along the nerves, except towards the base, where they are smooth, and punctate scabrous between them.

Geranium Park, Wyoming, altitude 7,500. No. 159. L. H. Pammel, July 1, 1897. Named in honor of the collector.

This species is apparently intermediate between *Melica bromoides* and *M. subulata*. The flowering glumes are much broader, less narrowly acuminate, and in general larger than in *Melica subulata*. The inflorescence and general aspect of the panicle and spikelets resemble those of *Melica bromoides*, but the flowering glumes are longer, more acuminate pointed and the internodes of the rachilla are shorter, the lowest in *Melica pammellii* being about 2 mm. long. It is further distinguished by the presence of a few hairs near the margin of the flowering glumes.

Distichlis spicata Greene. Grand Island, altitude 1,872; alkaline flats. Platte River bottoms. No. 98. Broken Bow, altitude 2,478; alkaline flats. No. 77. New Castle, altitude 4,019. No. 76. Sheridan, altitude 3,732; alkaline flats of Big and Little Goose Rivers.

Poa arctica R. Br. Rapid Creek Park, Sheridan County, altitude 7,500, and in Engelmann Spruce swamp. A beautiful and delicate grass. No. 138.

P. Buckleyana Nash. Rapid Creek Park, Sheridan County, altitude 7,500. Open places in parks, not common. No. 118. New Castle, altitude 4,019. Similar situations. No. 133. Dome Lake, Sheridan County, altitude 9,200. Moraines, dry places. No. 134.

P. compressa L. Grand Island, altitude 1,872. Introduced in streets, and flood plains of Platte River. No. 115. Rapid Creek Park, Sheridan County, altitude 7,500. This large open park is frequently used as a camping ground. The species was undoubtedly introduced. No. 120.

P. Fendleriana Steud. Dome Lake, Sheridan County, altitude 10,000. Near timber line. In open spruce woods. No. 129.

P. laevigata Scribner. Sheridan, altitude 3,732. Flood plains of Big and Little Goose, along irrigation ditches. No. 119.

P. leptocoma Trin. Rapid Creek Park, Sheridan County, altitude 7,500. A delicate grass occurring in cold bogs where the Engelmann Spruce grows. No. 128.

P. lucida Vasey. Spring above Big Horn, Sheridan County. Dome Lake,

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altitude 6,500. Open park, common. No. 156. New Castle, altitude 4,019. Near spring. No. 137.

P. nemoralis L. New Castle, altitude 4,019. In pine woods near streams and in cañons. No. 155. Rapid Creek Park, altitude 7,500. Common in open parks. No. 113. Dome Lake, Sheridan County, altitude 9,500. Open pine woods and moist places. No. 112. West branch of the Big Goose River and near the road to Shoshone Basin, altitude 8,500. Common in open pine woods. No. 68.

P. nevadensis Vasey. Sheridan County, Dome Lake Road. Geranium Park, altitude 7,500. This beautiful species produced an abundance of good forage and was common along the roadside. No. 132. Rapid Creek Park, Sheridan County, altitude 7,500. Common in open places. No. 230. New Castle, altitude 4,019; near spring. No. 131. In open woods and parks. A beautiful and productive grass growing in large quantities along the roadside.

P. wyomingensis Scribn. sp. nov. A rather stout, erect, glabrous perennial 4-7 dm. high with flat leaves and narrow, densely-flowered panicles 10-20 cm. long. Sheaths striate, smooth, the lowermost loose and more or less scarious; ligule hyaline acute 4-6 mm. long, leaves rather soft, 8-12 cm. long, 3-5 or 6 mm. wide, very smooth excepting at the rather abruptly pointed apex. Spikelets broadly lanceolate, acute, 5-7 flowered, 8-10 mm. long; empty glumes very acute, rather broadly lanceolate, strongly scabrous on the keels above and minutely scabrous all over, the 1st about 4 mm. long and 3-nerved, the 2nd broader than the first, 3-5-nerved and about 5 mm. long; flowering glumes ovate oblong, the first one usually 5-5 mm. long, usually erose at the obtuse apex, sometimes shortly mucronate by the prolongation of the midnerve, scabrous on the back with a somewhat crisp pubescence towards the base; the hairs extend on to the callus where they are about 0-5 mm. long. Palea shorter than the glume, strongly scabrous on the prominent keels.

Allied to *Poa nevadensis* but distinguished by its broader, less rigid, flat and glabrous leaves and larger flowering glumes, which are conspicuously pubescent towards the base. Also closely allied to *Poa Buckleyana* but the leaves are broader, less flaccid and smooth, not scabrous as in that species, the spikelets more numerously flowered (2-3-flowered in *P. Buckleyana*), the florets more distant and the flowering glumes are more distinctly pubescent near the base. Buckley describes the flowering glumes of *P. Buckleyana* as being naked at the base.

In clay soil above Big Horn, Sheridan County, Wyoming, altitude 6,000-7,800. No. 192. L. H. Pammel, July, 1897.

P. pratensis L. Hastings, altitude 1,943. Common in meadows near pump-house. No. 94, No. 116. Oxford, altitude 2,085. One of the finest lawns along the B. & M. R. R. in Nebraska occurs at Oxford, where this species is used. No. 181. Rapid Creek Park, Sheridan County, altitude 7,500; in parks. No. 126.

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P. rupestris Vasey. Dome Lake, Sheridan County, altitude 10,500. Near the timber line, and at timber line in open places. No. 124.

P. Suksdorfii Vasey. Dome Lake, Sheridan County, altitude 10,500. At timber line it forms a fine turf. No. 139. Dome Lake, altitude 9,500. Moraines, occurs with *P. rupestris* Vasey. No. 125.

P. Wheeleri Vasey. Rapid Creek Park, altitude 7,600. In swamps with Engelmann Spruce. No. 122. Sheridan County, near spring above Big Horn, Dome Lake Road, altitude 5,500. No. 67. Dome Lake, Sheridan County, altitude 9,500. Moraines and flats. No. 114. Dome Lake, altitude 10,000. Just below timber line. No. 154. Sheridan County, west branch of Big Goose, road to Shoshone Basin, altitude 8,500. No. 121. This species appears to delight in cold, wet swamps.

Panicularia aquatica Kuntze. New Castle, altitude 4,520. In cañons and running water, shallow brooks. No. 146*a*. Sheridan, altitude 3,812. No. 200.

P. nervata Kuntze. New Castle, altitude 4,019. In cañons near running water and low grounds. No. 123. Sheridan County, near Big Horn, altitude 4,000. Irrigation ditches. No. 183, No. 199.

Festuca brevifolia R. Br. Sheridan County, Dome Lake, altitude 10,500. At timber line. This species is common and grows in small bunches. No. 188.

F. elatior L. var. *pratensis* A. Gray. Grand Island, altitude 1,872. Platte River bottoms; thoroughly naturalized. The only place where the writer has seen it so common in the west. No. 84.

F. Jonesii Vasey. Sheridan, altitude 6,500. In open parks and borders of spruce and pine timber. No. 191*a*.

F. Kingii Scribner. Rapid Creek Park, Sheridan County, altitude 7,500-7,800. In open parks. No. 187, 182. A large and beautiful grass in dry places, spring above Big Horn, Dome Lake Road, Sheridan County, altitude 5,500. No. 87.

F. octoflora Walt. Alma, altitude 1,950. Common on dry prairies. No. 70. Grand Island, altitude 1,872. No. 69. New Castle, altitude 4,019. Occurs in pine woods and open dry places. No. 85.

F. ovina L. This species occurs near the spring above Big Horn, Sheridan County, Dome Lake Road, altitude 5,500; where it grows in dry places forming bunches. No. 169. No. 190 from the same place is doubtfully referred to this species. No. 187 is a variety of this variable species found in the same place. No. 153 is from Rapid Creek Park; common in dry places, altitude 7,500.

F. ovina L. var. *ingrata* Hackel. Sheridan County, on Dome Lake Road near spring, altitude 5,500. Grows in bunches in dry places. No. 189.

F. rubra L. Rapid Creek Park, Sheridan County, altitude 7,500. This species is extremely common in open dry places where it forms bunches of considerable size. It is much more valuable than *F. ovina*. No. 191.

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Bromus breviaristatus Buckl. Sheridan, altitude 3,732. Flood plains of Big and Little Goose Rivers, and along irrigation ditches. A valuable and one of the most common grasses with *Beckmannia erucaeformis*. No. 148. Sheridan County, Dome Lake Road, Geranium Park, altitude 7,500. In fertile soil of this park it is a most valuable grass. No. 51. Near spring edges of timber along the same road, altitude 5,500. No. 96.

B. Pumpellianus Scribner. Sheridan, altitude 3,732. Also along irrigation ditches. A very valuable grass. No. 166.

B. racemosus L. Grand Island, altitude 1,872. Near ice houses in Platte River bottoms abundantly naturalized. Very valuable. No 52, 97.

HORDEÆ.

Agropyron caninum L. Dome Lake Road above Big Horn in Sheridan County, altitude 7,810; common in parks. No. 165. Sheridan, altitude 3,712. No. 206.

A. dasystachum Vasey var. *subvillosum* S. & S. New Castle, altitude 4,017. Common in pine woods. No. 141.

A. divergens var. tenuispicum S. & S. Sheridan County, Dome Lake Road, altitude 5,500. Borders of woods, and in open woods. No. 86. Rapid Creek Park, Sheridan County. No. 150.

A. pseudo-repens S. & S. Rapid Creek Park, altitude 7,500. In open grassy parks, common. No. 63, No. 170. Dome Lake Road, Sheridan County, altitude 5,500, in open grassy woods. No. 64. Sheridan County, west branch of the Big Goose on road to Shoshone Basin, altitude 8,500, in open woods. No. 53. Broken Bow, altitude 2,478. In grassy meadows near stream. No. 54. Sheridan, altitude 3,712. No. 203.

A. Richardsoni Schrad. Sheridan, altitude 3,712. No. 211.

A. spicatum S. & S. Alma, altitude 1,950, prairies, abundant. No. 56. Hastings, altitude 1,943. Aurora, altitude 1,803. No. 55. Broken Bow, altitude 2,478. No. 58. Edgemont, altitude 3,415. No. 57. New Castle, altitude 4,019. No. 146, No. 177. Sheridan County, Dome Lake Road, Geranium Park, altitude 7,500. Sheridan County, altitude 3,712. No. 288. This species is one of the most common grasses in these parks, where it makes a fine growth. No 43. This occurs everywhere in Nebraska, S. Dakota and Northern Wyoming. The statement made by rangers that it is common only to the ranges of Northern Wyoming and Montana is erroneous, as the grass is equally common in Colorado, extending southwest to Arizona where it is one of the most valuable of the range grasses.

A. spicatum S. & S. var. *molle* S. & S. Sheridan County, Rapid Creek Park, altitude, 7,500, dry open parks. No. 140. Sheridan, altitude, 3,712. No. 196.

A. tenerum Vasey. Hastings, altitude 1,943, near pump-house. No. 61. Grand Island, altitude 1,872, along Platte River. In these bottoms it is a very common species. No. 60. Broken Bow, altitude 2,478, near streams. No. 62. Ravenna, altitude 2,008. Along railroad, and in low grounds. No. 59. Sheridan, altitude 3,712. No. 203.

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A. violaceum Vasey. Sheridan County, west branch of the Big Goose River on road to Shoshone Basin, altitude 8,500, in dry open woods. No. 142.

Hordeum cæspitosum Scribn. n. sp. An erect, cæspitose perennial, 3-5 dm. high with smooth culms and sheaths and terminal bearded spikes 4-7 cm. high. Ligule short, hardly 1 mm. long, very minutely fringed, broader than the flat, striate, scabrous, very acute leaves which are 5-15 cm. long and 3-5 cm. wide. Empty glumes subulate from the base, about 20 mm. long including the awns; the central floret nearly sessile, lanceolate fusiform, about 6 mm. long exclusive of the awn, which is 12 mm. in length, the lateral spikelets raised on short pedicels, as are the rudimentary florets of the lateral spikelets.

This species is chiefly distinguished from *H. pratense* Huds. by its longer and more slender awns and rather shorter flowering glumes. The glumes in *H. cæspitosum* are less scabrous and the shorter awns much more divergent. From *H. jubatum* this species is at once distinguished by its very much shorter awns and different habit of growth, and slender spikes.

Edgemont, South Dakota. No. 143. Pammel, June 24, 1897; also Geranium Park, Wyoming. No. 157. L. H. Pammel, July, 1897. Common in the Rocky Mountain region.

H. jubatum L. Alma, altitude 1,950, a weed in fields. No. 107. Oxford, altitude 2,085. No. 103. Hastings, altitude 1,943. No. 198. Aurora, altitude 1,803. A common weed everywhere. No. 102. Broken Bow, altitude 2,478. No. 106. New Castle, altitude 4,019, common. No. 105. Sheridan, altitude 3,862. No. 103.

H. pusillum Nutt. Grand Island, altitude 1,872. Common in streets. No. 101.

Secale cereale L. Aurora, altitude 1,800. An escape along railroads. No. 17. Grand Island, altitude 1,872. Also a frequent escape in streets. No. 175.

Elymus canadensis L. Alma, altitude 1,959. Common in dry soils. No. 45. Hastings, altitude 1,950. No. 186. Sheridan, altitude 3,612. No. 108, 210.

E. condensatus Presl. New Castle, altitude 4,019. A large and beautiful grass growing along the borders of woods. No. 49. Sheridan, altitude 3,732. Flood plains of Little and Big Goose River. No. 174. Big Horn, Sheridan County, altitude 4,009. Along irrigation ditches and in meadows. No. 49.

E. glaucus Buckl. Sheridan County, Geranium Park, altitude 6,500-7,000, common in open parks. No. 46.

E. robustus S. & S. Broken Bow, prairies, altitude 2,478. Small form. No. 145.

E. striatus Willd. Alma, altitude 1,950. In woods and small cañons. No. 44.

E. virginicus L. Alma, altitude, 1,950. Low rich woods, along Republican River near the foot-hills. No. 47 is a glaucus form; No. 100, from the same place but in open woods and higher ground. Sheridan, altitude 3,712. No. 205.

Sitanion elymoides Raf. New Castle, altitude 4,019, common in dry soil. No. 50.

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FUNGI COLLECTED IN COLORADO, WYOMING, AND NEBRASKA IN 1895, 1896, AND 1897.

H. HAROLD HUME.

INTRODUCTION BY L. H. PAMMEL.

In 1895 a collecting trip was planned embracing the region about Pike's Peak, Clear Creek Cañon and some other points in Colorado. Additional stops were made at several places in Nebraska, and for the sake of convenience these plants are also listed here, although we have excellent accounts of the fungi of this state by Professor Bessey, his students, Webber, Pound, and others. Full lists of the Nebraska fungi may be found in the reports of the Experiment Station and the excellent contributions issued by the University of Nebraska.

In the year 1896 a trip was made through northern Colorado. The first stop was made at Ft. Morgan, which is near the Platte River. Most of the collecting here was done in the river bottom. From there I went to Greeley, where a few specimens were collected, and later some were gathered in and about Ft. Collins.

I desire in this connection to express my obligations to Professors Crandall and Gillette for the numerous favors shown on the entire trip. Professor Crandall's familiarity with the country and knowledge of Colorado plants was especially valuable to me.

As to the relative importance of the parasitic fungi of the plains, a few general observations may be made in this connection. In the foot-hills, especially those adjacent to the plains, there are comparatively few widespread fungus diseases of plants although there are some species which are extremely abundant in places, as, for instance, the *Uromyces Sophoræ*, which is widely scattered on *Sophora*, its host plant. The abundance of some other species of fungi on the plains may also be noted. The *Æcidium Psoralæ* on *Psoralea* is widely spread and also the *Puccinia Malvastri*. These fungi undoubtedly influence very

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materially the abundance of these host plants on the plains. The only way to account for the abundance of these at lower altitudes is that the mycelium is perennial in the tissues of the hosts.

In places where there are dews or where moisture is more abundant, as in the flood-plains of the Platte River, parasitic fungi, like *Puccinia Xanthii*, occur in close proximity to the water. Entire plants are covered by it. Moisture, especially in the form of dew, is a very important factor in the distribution of fungi. As an illustration, it is not uncommon to find rusted wheat plants in close proximity to the irrigation ditches while in other parts the disease is not so common. It is well known that in and around these irrigation ditches heavy dews cover the grass in the morning.

We might note the fact here that grain rusts are not abundant at any point in Colorado, at least not nearly so common as we find them in the Mississippi Valley, and this is undoubtedly due to the fact that the plants are supplied with water by irrigation.

Farther up in the foot-hills, especially in the narrow cañons, fungi are more numerous. Frequently thousands of plants are affected, as, for instance, we find the *Æcidium alenii* on *Shepherdia Canadensis*. Near the timber-line and in the swamps and bogs, fungi are more numerous. As an illustration, the *Phragmidium Fragariastri* is found on nearly every plant of *Potentilla gracilis* in places.

Of the fungi on woody plants mention may be made of the *Peridermun cerebrum* on the Lodge-pole Pine. Although this fungus is widely distributed it is nowhere abundant. It usually occurs on the younger branches where it forms large swellings. The limb, in the course of a year or two, dies because the fungus cuts off the supply of nutrient material.

Among other interesting fungi of trees mention may be made of the Witches' Broom (*Exoascus nanus*) on *Betula occidentalis*. Hundreds of branches on a single tree were affected, giving it quite a strange appearance. This species has never been reported for this continent so far as I know and was first described by Johanson from specimens collected in Finland. Other *Exoasci* were not uncommon both at and around Pike's Peak and a large number of leaves of the Rocky Mountain Oak (*Quercus Gunnisoni*) in North Chyenne Cañon were affected. Several species of the genus *Prunus* were quite commonly affected along the Manitou trail.

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The species here enumerated were in part identified by the writer; but the whole collection was worked over by H. H. Hume and the credit of naming the species belongs to him. I desire to express my thanks to Dr. W. G. Farlow, who has so kindly examined several of the *Uredineæ* and some of the *Exoasci*, and to J. B. Ellis for the identification of a few species.

AGARICACEÆ.

Lenzites bicolor F. On old logs, Larimer County, Col., (198).

POLYPORACÆ.

Fomes carneus Nees. On old logs, Fort Collins, Col., (258).

THELEPHORACEÆ.

Exobasidium Vaccinii (Tuck.) Woron. On leaves of *Vaccinum* sp., Little Beaver, Larimer County, Col., (130).

Exobasidium sp. On leaves of *Arctostophylus* sp., Fort Collins, Col., (135). Too immature to identify.

NIDULARIACEÆ.

Cyathus striatus (Huds.) Hoff. On ground, above Big Horn, Sheridan County, Wyo., (260).

UREDINEÆ.

Uromyces Euphorbiæ Cooke & Peck. On foliage of *Euphorbia Preslii*, Crete, Neb., (5); *Euphorbia marginata*, Golden, Col., (10); Hastings, Neb., (64); Lincoln, Neb., (155); *Euphorbia glyptosperma*, Lincoln, Neb., (79); *Euphorbia obtusata*, Lincoln, Neb., (80). This caused the plants to have the usual attenuated appearance.

Uromyces scutellatus (Schrank) Lev. On foliage of *Euphorbia dictyosperma*, Sheridan, Wyo., (32).

Uromyces Sophorae Peck. On foliage and stems of *Sophora sericea*, Fort Collins, Col., (30); McCook, Neb., (15). This host is common in some places and the fungus occurs locally.

Uromyces Trifolii (Hedw.) Lev. On leaves of *Glycyrrhiza lepidota*, Fort Collins, Col., (39); Sheridan, Col., (57); Greely, Col., (61),

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(62.) The host plant is quite common in many places and usually the whole plant is affected by the fungus.

Uromyces Zygadeni Peck. On leaves of *Zygadenus elegans*, Sheridan, Wyo., (137).

Melampsora farinosa (Pers.) Schroet. On catkin of *Salix* sp., Manitou trail, Col., (31); on leaves of *Salix* sp., Beaver Creek, Col.,(78). The occurrence of this fungus on the leaves was very common; only one catkin was found affected.

Puccinia Anemones-virginianæ Schwein. On leaves of *Anemone multifida*, Stove Prairie Hill, Col. (142). This species was not uncommon on this anemone.

Puccinia Caricis (Schum.) Rebent. *Æcidium* on foliage of *Urtica gracilis* Fort Collins, Col., (8); *Carex* sp., Fort Collins, Col., (65). The *Æcidium* stage was extremely abundant on *Urtica* along the banks of streams and in timber—in fact, wherever the host was found.

Puccinia congregata Ell. and Hark. On leaves of *Saxifraga rivularis*, Beaver Creek, Col., (76).

Puccinia curtipes Howe. On leaves of *Heuchera bracteata*, Colorado Springs, Col., (21); on *Saxifraga* sp., Beaver Creek, Col., (73).

Puccinia Distichlydis E. & E. On leaves of *Distichlis maritima*, McCook, Neb., (18). In rather moist places this species was not uncommon.

Puccinia Epilobii DC. *Æcidium* on leaves of *Elipobium* sp., West Branch Big Goose, Wyo., (83). Abundant in a small area affecting a very large number of plants.

Puccinia Gayophyti Pk. On leaves of *Gayophytum racemosum*, Fort Collins, Col., (37); Beaver Creek, Col., (54). Very plentiful on plants under ledges of rock.

Puccinia Geranii-silvatici Karst. On leaves of *Geranium* sp., Big Horn Mountains, Wyo., (70). Although this Geranium was abundant the fungus was rare, only a few affected leaves being found.

Puccinia graminis Pers. On leaves of *Poa* sp., Larimer County, Col., (87).

Puccinai Helianthi Schw. On foliage of *Helianthus annuus*, Crete, Neb., (2); McCook, Neb., (4); Lincoln, Neb., (66). This species was abundant throughout Nebraska.

Puccinia heucheræ (Schw.) Diet. On leaves of *Mitella pentandra*,

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Little Beaver, Col., (55). *Saxifraga punctata*, Little Beaver, Col., (36). Not common.

Puccinia irregularis Ellis & Tracy. On foliage of *Solidago* sp., head of Happy Hollow, Larimer County, Col., (81).

Puccinia Menthæ Pers. *Æcidium* stage on leaves and stems of *Monarda fistulosa*, Long Gulch, Larimer County, Col., (46). Abundant in a few spots.

Puccinia Pimpinellæ (Strauss) Link. On leaves of *Osmorrhiza longistylis*, Dome Lake, Wyo., (84).

Puccinia rubigo-vera (DC.) Wint. On leaves of *Triticum vulgare*, Crete, Neb., (145).

Puccinia Stipæ Arth. On leaves of *Stipa* sp., Fort Collins, Col., (49).

Puccinia Violæ (Schum.) DC. *Æcidium* stage on leaves of *Viola Canadensis*, Big Horn, Sheridan County, Wyo., (58).

Puccinia Xanthii Schw. On leaves of *Xanthium Canadense*, Fort Morgan, Col., (25). Abundant only in Platte River bottoms, near the water.

Puccinia Crandallii Pammel & Hume n. sp. III. Sori variable, usually rather broad, long, black to brownish, tardily ruptured; spores smooth, sub-ovate or clavate, apex somewhat truncated, rounded or pointed; epispore thickened at the apex, 36–51 x 18–29μ; pedicel slightly colored, stout, longer than the spore. Differs from *P. graminis* in the much stouter pedicel and usually wider spores. On leaves and sheathes of *Festuca Kingii*, Larimer County, Col., (69).

Puccinia uniformis Pammel & Hume n. sp. II & III. Sori amphiginous, small, orbicular, surrounded by the ruptured epidermis, sometimes confluent.

II. Uredospores sub-globose, light brown, epispore smooth, thin, 12-15μ.

III. Teleutospores light brown, elliptical to sub-globose, obtusely rounded at the ends, slightly constricted at the septum, epispore smooth, thin, not thickened at the apex, 19–22 x 12–15μ; pedicel hyaline, fragile, shorter than the spore. On leaves of *Rumex paucifolius*, Dome Lake, Wyo., (86).

Gymnosporangium clavariiforme (Jacq.) Rees. *Æcidium* on fruit of *Amelanchier alnifolia* Nutt., Dome Lake, Wyo., (38). Abundant at high altitudes.

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Phragmidium Fragariastri (DC.) Schroet. On leaves and stems of *Potentilla gracilis* var. *fastigiata*, Dome Lake, Wyo., (89); Beaver Creek, Col., (72). This host was abundant at the timber line, and in places nearly all the plants were affected.

Phragmidium Rubi (Pers.) Wint. On leaves of *Rubus deliciosus*, Fort Collins, Col., (92).

Phragmidium subcorticium (Schrank) Wint. On leaves of *Rosa* sp., Long Gulch, Larimer County, Col., (44); N. Cheyenne Cañon, (67); Fort Collins, Col., (68); Beaver Creek, Col., (77). Abundant in some places.

Chrysomyxa Pirolæ (DC.) Rostr. On leaves of *Pirola elliptica*, Beaver Creek, Larimer County, Col., (55). Common.

Thecopsora Vacciniorum (Link) Karst. On leaves of *Vaccinum* sp., Beaver Creek, Larimer County, Col., (150).

Calyptospora Gœppertiana J. Kühn. On twigs of *Vaccinum* sp., Beaver Creek, Larimer County, Col., (150).

Æcidium abundans Pk. On foliage of *Symphoricarpos racemosus*, Fort Collins, Col., (7); above Big Horn, Wyo., (33); La Porte, (43). This *Symphoricarpos* is abundant throughout the eastern slopes of the Rocky Mountains and one is almost certain to find the Æcidium on most of the plants.

Æcidium Allenii Clinton. On foliage of *Shepherdia Canadensis*, Larimer County, Col., (11), (34), (53). *Shepherdia argentea*, Sheridan, Wyo., (13), (90). The æcidium on *S. Canadensis* was quite common in higher altitudes; on *S. argentea* only a few specimens were found.

Æcidium aquilegia Pers. On leaves and petioles of *Aquilegia caerulea*, Beaver Creek, Col., (51). Abundant under a rocky ledge above the timber line.

Æcidium clematidis DC. On foliage and stems of *Clematis ligusticifolia*, Golden, Col., (6); Fort Collins, Col., (27), (40); Greely, Col., (29); La Porte, Col., (63). The host grows abundantly in moist woods at lower altitudes. The fungus is very common, involving stems, petioles, and leaves, twisting and distorting the plant.

Æcidium compositarum Mart., var. *Helianthi* Burrill. On leaves of *Helianthus annuus*, Fort Morgan, Col., (26); *Helianthus grosse-serratus*,? Fort Collins, Col., (41). Not abundant at Fort Morgan, but abundant in moist woods near Fort Collins.

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Æcidium compositarum Mart. On leaves of *Rudbeckia laciniata*, Beaver Creek, Col., (45); *Erigeron* sp., Beaver Creek, Col., (75); Arnica sp., Rapid Creek Park, Wyo., (82).

Æcidium compositarum Mart., var. *Lactucæ* Burrill. On leaves of *Lactuca pulchella*, Fort Collins, Col., (47). It was found abundantly in a few spots. The *æcidium* cups sometimes occur on the upper surface of the leaf in narrow longitudinal lines.

Æcidium Ellisii Tracy & Gall. On leaves of *Chenopodium album*, Fort Morgan, Col., (146). Rare.

Æcidium Euphorbiæ Gmel. On foliage of *Euphorbia Preslii*, Crete, Neb., (3); *Euphorbia marginata* Pursh., Golden, Col., (20). Locally common.

Æcidium Grossulariæ Schum. On leaves of *Ribes* sp., Beaver Creek, Col., (74). Abundant in a few localities.

Æcidium Petalostemonis Kell. & Carl. On *Petalostemon* sp., above Big Horn, Wyo., (71).

Æcidium Pentastemonis Schw. On leaves of *Penstemon* sp., N. Cheyenne Cañon, Col., (23); Golden, Col., (24). Though evidently widely distributed it was not found in abundance in either locality.

Æcidium Phaceliæ Pk. On leaves of *Phacelia circinata*, Fort Collins, Col., (14).

Æcidium Psoraleæ Pk. On foliage of *Psoralea tenuiflora*, Colorado Springs, Col., (1); Fort Morgan, Col., (56). Widely distributed, affecting the entire plant.

Æcidium Ranunculacearum DC. On foliage of *Ranunculus Cymbalaria*, Fort Collins, Col., (9); on leaves of *Anemone* sp., Fort Collins, Col., (48); on leaves, flowers and stems of *Delphininm azureum*, Larimer County, Col., (16). The fungus was not found in any great quantity on any of the hosts. That on *Delphinium* was not typical, the cups being larger and much lighter in color than in the type.

Æcidium Sommerfeltii Johnson. On foliage of *Thalictum Fendlerii*, N. Cheyenne Cañon, Col., (12); Manitou Trail, Col., (19); Fort Collins, Col., (38), (50); *Thalictrum sparsiflorum* Turcz, Rapid Creek Park, Wyo., (52), (88). Widely distributed and in places very abundant.

Œcidium. On leaves of unknown species of *Umbelliferæ*, above Big Horn, Wyo., (59).

Roestelia (*spermagonia*). On Pyrus sp., Colorado Springs, Col., (133).

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Peridermium cerebrum Pk. On branches of *Pinus Murrayana*, (91). Found throughout the region but never abundant.

Uredo ribicola C. & E. On leaves of *Ribes aureum*, Beaver Creek, Col., (211).

Uredo speciosa Pk. On leaves of *Rubus deliciosus*, Golden, Col., (28); Fort Collins, Col., (93); N. Cheyenne Cañon, Col., (93); Manitou Trail, Col., (95).

USTILAGINÆ.

Ustilago aristidæ Pk. In ovaries of *Aristida purpurea*, McCook, Neb., (96). This was locally abundant.

Ustilago Avenæ (Pers.) Jens. In ovaries of *Avena sativa*, McCook, Neb., (97); Crete, Neb., (98).

Ustilago Buchlöes Ell. & Tracy. In ovaries of *Buchloe dactyloides*, Lincoln, Neb., (100). A few specimens were collected at Lincoln. It was not abundant.

Ustilago Tritici (Pers.) Jens. In ovaries of *Triticum vulgare*, Crete, Neb., (99).

Eutyloma Physalides (Kalchlbr & Cooke) Wint. On leaves of *Physalis* sp., McCook, Neb., (—). This material was in excellent condition, spores germinating.

Sphacelotheca hydropiperis (Schum.) De Bary. In ovaries of *Polygonum bistorta*, Rapid Creek Park, Wyo., (101); *Polygonum viviporum*, Rapid Creek Park, Wyo., 102. Not abundant.

Schizonella melanogramma (DC.) Schroet. On leaves of *Carex* sp., above Big Horn, Wyo., (105).

Sorosporium Ellisii Wint. In ovaries of *Andropogon furcatus*, McCook, Neb., (103). For a considerable distance this fungus was common along the roadside.

PERONSPOROCEÆ.

Cystopus Bliti (Biv.) De Bary. On leaves of *Amarantus retroflexus*, Lincoln, Neb., (154).

Cystopus Portulacæ (DC.) Lev. On leaves of *Portulaca oleracea*, McCook, Neb., (120).

Cystopus Tragopogonis (Pers.) Schroet. On leaves of *Artemesia bien-*

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nis. Rist's Cañon, Col., (121). This is not usually common, but was found abundantly in one place on the above host.

Plasmopara Geranii (Pk.) Berl. On leaves of *Geranium* sp., Rapid Creek Park, Wyo., (156). This is also a somewhat rare fungus, and although this species of *geranium* is extremely abundant in the parks it was only after a diligent search that a few fungus-affected leaves were found.

Plasmopara Kellermanii (Ellis & Halstead) Swingle. On leaves of *Iva Xanthiifolia*, McCook, Neb.,(122); Sheridan,Wyo.,(123); Omaha, Neb., (140). Was quite abundant in a few localities.

Peronospora Corydalis De Bary. On foliage of *Argemone platyceras*, Golden, Col., (124). This fungus was less abundant at this point than at other localities. The fungus has also been collected in Western Iowa.

Peronospora effusa (Grev.) Rabenh. On leaves of *Chenopodium album*, Larimer County, Col., (139); Fort Collins, Col., (147); Crete, Neb., (134). This was not common at any of the points.

Peronospora myosotidis De Bary. On foliage of *Myosostis sylvatica* var. *alpestris*, Bosworth's Ranch, Larimer County, Col., (143). Quite a number of plants were found in a few places. The plants were weak and spindling.

PERISPORACEÆ.

Podosphæra Oxyacanthæ (DC.) De Bary. On leaves of *Prunus Virginiana*, Manitou Trail, Col., (111); N. Cheyenne Cañon, Col., (112). This was not abundant either at N. Cheyenne Cañon or along the Manitou Trail.

Spærotheca castagnei Lev. On leaves and stems of *Gilia* sp., above Big Horn, Sheridan County, Wyo., (107). This was extremely common on plants in damp places along the roadside.

Microsphæra Symphoricarpi Howe. On leaves of *Symphoricarpos occidentalis.* (110).

Erysiphe graminis DC. On leaves of *Poa flava*, above Big Horn, Wyo., (109); *Poa Wolfii*, Golden, Col., (108). This was very abundant at Big Horn. Generally this fungus is not found fruiting, but these specimens showed well-developed perithecia. At Golden it was extremely abundant on grass growing in damp Douglas Spruce woods in fact, there was scarcely a plant that was not affected.

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SPHÆRIACEÆ.

Sphærella Fragariæ (Tul.) Sacc. On leaves of *Fragaria vesca*, Larimer County, Col., (125) (207); above Big Horn, Wyo., (205).

Leptosphæria eustomella Sacc. On dead culms of *Festuca Kingii*, Sheridan County, Wyo., 136.

Leptosphæria culmifraga Fr. On dead culms of *Festuca Kingii*, Sheridan County, Wyo., (136*a*).

Pleospora herbarum (Pers.) Rabh. On old stalks of *Lithospermum* sp., Sheridan County, Wyo., (259.)

DOTHIDEACEÆ.

Phyllachora Aristidæ (Schw.) Sacc. On leaves of *Distichlis maritima*, Fort Collins, Col., (126).

Phyllachora Trifolii (Pers.) Tuck. On leaves of *Trifolium hybridum*, Broken Bow, Neb., (132).

Ploworightia morbosa (Schw.) Sacc. On leaves of *Prunus Americana*, Alma, Neb., (106).

STICTACEÆ.

Psuedopeziza medicaginis (Lib.) Sacc. On leaves of *Medicago sativa*, Fort Morgan, Col., (131).

GYMNOASCACEÆ.

Taphrina cærulescens (Det. M.) Tul. On leaves of *Quercus undulata* var. *Gunnisoni*, N. Cheyenne Cañon, Col., (113). This species is quite common in and about N. Cañon in the vicinity of Colorado Springs, but nowhere else was the species found.

Exoascus cerasi (Tuck.) Sadeb. On foliage of *Prunus Virginiana*, Manitou Trail, Col., (114); N. Cheyenne Cañon, Col., (115); Stove Prairie Hill, Col., (116); Bosworth's Ranch, Col., (117). This was not particularly abundant except in a few places along the Manitou Trail. The leaves were somewhat puffed out, giving to them a striking appearance.

Exoascus Institiæ Sadb. On foliage of *Prunus Pennsylvanica*, N. Cheyenne Cañon, Col., (119). This was common just below the timber line along the Pike's Peak Railroad. The diseased leaves of the trees were easily detected by their blistered appearance.

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Exvascus nanus (Johanson) Sacc. On leaves, twigs and branches of *Betula occidentalis*, Happy Hollow, Larimer County, Col., (118). One tree was found very much affected, a number of branches showing well-marked Witches' Brooms.

SPHÆROPSIDEÆ.

Septoria acerina Pk. On the leaves of *Acer glabrum*, Pike's Peak, Col., (128).

Septoria expansa Niessl. On leaves of *Geranium* sp., Beaver Creek, Col., (212).

Septoria Jamesii n. sp. Pammel & Hume. Spots small, yellow, orbicular, becoming confluent and at length involving the whole leaf which becomes uniformly straw-colored; perethecia scattered, black, sub-globose; sporules hyaline, straight, cylindrical, 28–32 x 2.5–3μ. On leaves of *Stellaria Jamesii*, Golden, Col., (201).

Septoria lepidiicola Ell. & Mart. On leaves of *Lepidium apetalum*, Grand Island, Neb., (203).

Septoria lupulina Ellis & Kell. On leaves of *Humulus lupulus*, Lincoln, Neb., (153). Collected by F. R. Clements.

Septoria Pentstemonis Ell. & Kell. On leaves of *Pentstemon* sp., Beaver Creek, Col., (210).

Septoria Siscyii Pk. On leaves of *Echinocystis lobata*, Fort Collins, Col., (141).

Septoria Ribis Desm. On *Ribes aureum* Golden, Col., (204).

MUCEDNIACEÆ.

Microstroma americanorum Pammel & Hume, n. sp. Spots large, pale, later brown, circular, becoming irregular; conidiophores hyaline, fasciculate, hyphophyllus, upper part somewhat irregular, 39–47.5 x 3μ; conidia hyaline, ovate-oblong, usually two nucleated, epispore thin, 9-11 x 6-9μ. On leaves of *Cnicus americanus*, Larimer County, Col., (209).

Ramularia arnicalis Ell. & Ev. On foliage of *Arnica cordifolia*, Larimer County, Col., (130); *Arnica* sp., Larimer County, Col., (208).

Ramularia Psoraleæ Ell. & Ev. On leaves of *Psoralea argophylla*, McCook, Neb., (202).

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Ramularia rufo-maculans Pk. On leaves of *Polygonum incarnatum*, Sheridan, Wyo., (206).

Ramularia Urticæ Ces. On the leaves of *Urtica gracilis*, Lincoln, Neb., (151).

Cladosporium gramimum Corda. On glumes of *Triticum vulgare*, Crete, Neb., (114).

Cercospora clavata (Ger.) Pk. On leaves of *Asclepias speciosa*, McCook, Neb., (127).

Cercospora dubia (Riess) Wint. On leaves of *Chenopodium hybridum*, Lincoln, Neb., (152).

Cercospora Geranii Kell. & Swin. On leaves of *Geranium Fremontii*, Manitou Trail, Col., (129).

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SYNOPSIS OF PROCEEDINGS

OF THE

Davenport Academy of Natural Sciences.

1897—1898.

January 7, 1897.—ANNUAL MEETING.

President Edward S. Hammatt in the chair; a large number of members and visitors present.

Reports of the various officers were presented as follows:

RECORDING SECRETARY'S REPORT.

During the year 1896 there have been twelve regular meetings, one trustees' meeting, and one annual meeting. The attendance upon the regular meetings averages eight.

Eight regular and five honorary members have been elected during the year. Two members have died: Professor Wachsmuth of Burlington and Mr. W. H. Holmes of Davenport.

Lectures have been delivered before the Academy by Professor J. A. Udden of Augustana College, Rock Island, on Kansas Mounds; by Professor F. J. Walz, Local Signal Service Observer, on Weather Forecasts; by Professor L. W. Andrews of Iowa City on X-Rays; by Doctor Edward Gudemann of Davenport on The Development of Chemistry; and by Mr. George R. Putnam of the U. S. Coast and Geodetic Survey on A Recent Trip to the West Coast of Greenland.

The present number of life and other members is 142.

EDWARD BORCHERDT, *Recording Secretary.*

CORRESPONDING SECRETARY'S REPORT.

During the year 1896 the correspondence was as follows: Letters received, 111; letters and acknowledgements written, 209. There was no departure from the ordinary subjects that from year to year come before the Secretary.

W. H. BARRIS, *Corresponding Secretary.*

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LIBRARIAN'S REPORT.

The number of books and pamphlets received since the last annual statement is: foreign publications, 467; domestic, 935; total, 1,402. Thenumber of books and pamphlets, bound and unbound, now in the library is 32,855. These accumulations come to us chiefly in exchange for our own Proceedings, which we are sending to scientific societies in all civilized countries, and indicates in a substantial way an appreciation of the efforts of this Academy which must be encouraging to every member.

Additional shelving has been provided and a rearrangement and better classification (made necessary by the growth of the library) has been undertaken and prosecuted as the limited time of your Librarian permitted. This work, to which several members have lent much aid, is well begun.

As heretofore, a crying need in this department is binding. The small appropriation for the purpose granted early in the year has not been used because, by reason of limited funds, more imperative wants of the Academy have with much difficulty been met.

The considerable effort which has been given to the beginning of a Library Index has plainly proven that it is practically impossible to accomplish this important work by voluntary labor. It therefore remains, doubtless, the most urgent business of the incoming administration to provide means and cause the work to be done by a competent person under the direction of my successor.

C. E. HARRISON, *Librarian.*

CURATOR'S REPORT.

The year has brought to the Academy museum substantial and varied additions. The first donation of the year was received from Mrs. Dr. C. C. Parry. It was a large, carefully wrought blanket made by the Pino Indians, and had a market value of one hundred dollars. In February T. Richter & Sons presented a wonderfully well preserved skin of the white skunk, obtained through the agency of the Musquakie Indians located near Cedar Rapids. In their dealings with the Company for twenty years nothing of the kind has been met with. Its rarity was further vouched for by the Indians, who pronounced it the only specimen they had ever obtained. In March the Historical Department was favored through Mr. Augustus F. Mast with the copies of his appointment to the postmastership of Davenport for the years 1856 and 1860—the one signed by President Buchanan, the other by President Pierce—both under glass and substantially framed.

In March was received from Mr. Clarence B. Moore of Philadelphia the core of a conch shell from the shell beds of Florida, with an interesting letter as to its finding and probable use.

In May Mr. C. A. Ficke presented to the Academy an Egyptian mummy obtained from the Boulak Museum of Cairo. Of the genu-

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ineness of this relic of antiquity there can be no reasonable doubt whether we consider the opportunity of the giver or the institution from which it came. Dating back to the 20th dynasty of the Pharaohs, it had its origin in an age that has contributed much to the archæological wealth of the present century. A mummy very much like this has just been received by the Museum of Fine Arts in St. Louis. Prof. Ives, in charge, is most enthusiastic in its praise. This comes to us in as good condition as found in any museum. The mummy itself suggests the care and labor of the embalmer and throws light on the manners and customs of a people passed away. The ornamentation of the coffin is a work of highest art and the figures stand forth as clear cut and the colors as effective as though they were wrought but yesterday. The Academy is to be congratulated in the possession of such an addition to its art treasures.

In May, Mrs. M. L. D. Putnam presented a collection of shells from Florida, with echinoids and corals. The shells were submitted to Miss Sadie Foote, and on examination several were found to be new to the Academy and were carefully labelled. At the same time several large and small cestacian vertebræ and fine teeth from the South Carolina phosphate beds were received from Mr. George Putnam. A collection of Mexican relics was bought of Prof. Starr of the University of Chicago. This collection included twenty pieces of pottery from ancient Mexican graves. Among these are two two-eared jars, one three-eared jar, three pitchers, three corndishes, three tripod food dishes, three obsidian flakes, three spindle wheels, and two scraping knives. Collected in another section were six of the puzzling little heads to be found in San Juan de Teotihuacan, remarkably human little carved stone faces. There was also an obsidian nucleus and six little pottery vessels from Chapala almost as puzzling as the faces.

In June, Captain Hall remembered us by sending one large grooved stone axe, with thirty or forty flint implements, among them one exquisitely formed, leaf-shaped, over a foot in length, and with a central breadth of two inches, made of a jasper-colored flint.

In July, the Academy received from Dr. Palmer a collection of one large and one small celt, one small axe, a discoidal stone with minerals and two geodes.

In September, Captain Hall sent us two axes, one quite small, and thirty flint implements and arrows, large and small, mostly perfect.

In November, the gift of a genuine Eskimo kayak came to us from Greenland, a present from Mr. George R. Putnam. This now occupies a conspicuous place in the Academy. It is a model of grace and beauty. The outfit is in keeping with the appearance of the craft and the objects sought to be accomplished by it. The most primitive workmanship characterizes every article used. Everything needed has its place. All the simple devices of the Greenland Eskimo may be seen attached to the kayak in some place, as though ready for use. Paddle and harpoon, spear and casting stick, bird spear and sealskin

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bladder and screen to protect the sailor and deceive the seal. And to add to the interest of the visitor the donor has taken pains to label each article, and the part it is to take is clearly pointed out.

A noteworthy accession was made to the museum by a gift from Mrs. Dr. Parry, comprising nearly fifty different articles. They may be classed under the head of minerals, shells from the California seacoast, handiwork of the western Indians in their money, basket work, shell work, textile fabrics and products of the farm, with archæological and ethnological specimens. It is needless to say they were uniformly well selected and carefully labelled with name and locality.

In the same month Mrs. Major McClelland presented two beautiful, exquisitely delicate corals gathered on the Bermuda Islands.

Through Mrs. Putnam, Mrs. Underhill of Buffalo, N. Y., has sent to us a series of silver pins, once the property of the Tuscarora Indians of Western New York. It is claimed the art of working them was lost two hundred years ago. They become more scarce every year. The Indians part with them only when compelled to do so through their needs. Each form has for them a mystical meaning. The Academy had nothing of the kind in its collection. Mrs. Underhill kindly proffered to increase the number already sent. This gift is in keeping with the ethnological character distinguishing those of the present year.

Captain Hall sent his third collection at the close of the year. It comprises one remarkably large grooved stone axe, one small axe, one celt, two hematite miniature stone axes, twenty-three flint implements and two small arrow points. Ray Willard of Rapids City contributing a fine celt to the collection.

It is a remarkable fact that of the sixteen donations received this year no less than eleven have been more or less connected with ethnology and archæology. Our own government has published through the Bureau of Ethnology fifteen large quarto volumes on the subject. Other governments have shown a like interest. Universities and Acadamies of Science have formed associations to advance the science. Magazines in this country are devoted exclusively to the study. Our foreign exchanges supply us with their papers on the subject. The world seems to be moving in that direction, gathering up from every source material to throw new light upon the history, habits, customs, languages, arts and sciences of nations that have long passed away or have been overlooked.

We are in line with the work being done, not so much through what we have done this year, but because of what has been done in former years. Egypt, Greenland, Mexico, Florida, California — the Mound-builder of yesterday — the Indians of the west, as well as the east, have contributed to the enrichment of our archæological collection — one of the most notable features of this Academy.

W. H. Barris, *Curator.*

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TREASURER'S REPORT FOR 1896.

GENERAL FUND.

RECEIPTS.

Balance on hand	$ 41.24	
Balance on hand, error, 1895	17.21	
From Dues	126.00	
Initiation fees	95.00	
Interest	84.00	
Annual subscriptions	426.00	
Donations	382.00	
Door admissions	47.55	
Newbold estate	109.00	$1,328.00

EXPENDITURES.

Paid Salary of Curator	$525.74	
Janitor	95.50	
Lights	5.34	
Fuel	37.03	
Water	16.00	
Repairs	57.25	
Printing	7.20	
Expenses of lecture	11.50	
New furnace	215.00	
Cleaning and arranging	26.60	
Postage, express, etc	26.76	
New cases	19.83	
Cementing basement	100.00	$1,143.75
Amount on hand in bank	$140.29	
Amount on hand with Treasurer	43.96	$ 184.25
		$1,328.00

FRANK NADLER, *Treasurer.*

PUBLICATION FUND.

RECEIPTS.

Balance on hand from 1895		$ 33.65
From interest from Putnam Fund	$ 96.00	
Interest from Putnam Fund	142.37	
Sale of Proceedings	4.50	
Interest Putnam Fund	118.75	
Interest Putnam Fund	118.75	$ 480.37
		$ 514.02

EXPENDITURES.

Paid Edward Borcherdt, 5½ forms Vol. V., etc	$ 96.00	
Edward Borcherdt	12.25	
Edward Borcherdt, Prof. Starr's paper, extras	16.00	
Egbert, Fidlar & Chambers, binding Vol. V	50.00	
Drawings for Vol. VI	85.33	
Edward Borcherdt, account	200.00	$459.58
Balance on hand January 1, 1897		54.44
		514.02

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REPORT OF PUBLICATION COMMITTEE.

In reporting at the close of this my fifteenth year as Chairman, I wish to express the gratification I feel on the result to the library of the Academy through these publications. In the year 1872 the number of bound and unbound volumes in the library was 311, most of these obtained by purchase. To-day our Librarian reports the number of books and pamphlets in the library at 33,955.* These volumes come entirely through exchange and not from purchase. They bring us in touch with all scientific societies of the world and give us the latest scientific discoveries and most advanced thought.

Volume VI., about to be presented to the public, has been exactly four years in preparation and will contain the first entomological paper published since the pen and engraving tools of the late J. D. Putnam were laid aside in 1881.

I would like to remind the Davenport public that, while an endowment fund has made further aid in this work unnecessary for the present, there are other important objects in the Academy demanding their support.

The papers published during 1896 were: "A List of Coleoptera from the Southern Shore of Lake Superior, with Remarks on Geographical Distribution," by H. F. Wichkam, M.S., covering 45 pages; "Stone Mounds and Serpent of Hughes County, South Dakota," by John M. Helmick; "A Shell Gorget from Mexico," by Frederick Starr, Ph.D. (2 wood cuts); "A Revision of the Truxalinæ of North America," by Jerome McNeill, 96 pages. This paper is beautifully illustrated by six plates containing over one hundred drawings by the skillful hand of Miss A. Simonds, and engraved by the Boston Heliotype Company. Prof. Howard of the Agricultural Department, Washington, praises them very highly for perfection in drawing.

MRS. M. L. D. PUTNAM, *Chairman.*

PRESIDENT'S ANNUAL REPORT.

EDWARD S. HAMMATT, January 6, 1897.

MEMBERS OF THE ACADEMY, LADIES AND GENTLEMEN:

We are here tonight to review the work of the past year, and by its experiences be guided in shaping our course for the future. We have in the reports just laid before us a detailed statement of the work that has been done. The reports of the Finance Committee and Treasurer show that, while there is a small deficit, daily collections the coming year will readily balance this account. One of the best methods of relieving future Finance Committees of an irksome duty would be to provide for running expenses by endowments. This plan has already been suggested and well begun by Mrs. M. L. D. Putnam. If each

* The number of books and pamphlets in the library at this date (May 16, 1899,) is 37,073.

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of our members will coöperate with the Finance Committee to this end, sufficient funds could be raised to place the Academy on a sound financial basis and secure for it its just position as one of the important educational factors in the State.

The community at large does not realize the educational value of this organization. The late Prof. G. Brown Goode of Washington, in his annual report for 1895 on museums, says: "The degree of civilization to which any nation, city or province has attained is best shown by the character of its public museums and the liberality with which they are maintained." Permit me for a moment to remind you and the public in general that we are an organization not for self-aggrandizement or glorification, but exist, in the words of our constitution, for the purpose of "the increase and diffusion of knowledge of the natural sciences by the establishment of a museum, the reading and publication of original papers, and other suitable means." In the twenty-nine years of our life as an Academy much has been done to make good our claim to a more generous consideration by the public. We have an enviable reputation among scientists and scientific institutions of Europe, Australia, and America. In furtherance of the objects of our organization a course of training should be arranged to coöperate with that of the public schools. A rearrangement of case specimens should be made so as to provide for two classes of users, the public and students in science, the specimens for study to be removed under proper surveillance, while specimens for public view should not be handled. We have a standing committee for each of the various departments of science represented. Our By-Laws provide that they shall assist the Curator in arranging donations and deposits in the several departments. It should be made obligatory on those being honored by such appointments to give a small working interest to the museum needs and to make written reports on the condition of their departments. If this small amount of necessary time cannot be given to this work, would it not be better to abandon the museum committee?

We have been greatly favored the past year by two very interesting and important donations to our museum. The statement was made a year ago that one of its great needs was a mummy. One of our Vice-Presidents, Mr. C. Ficke, when about to start on his Eastern trip, intimated that this want might be filled. He was, therefore, promptly provided with the necessary credentials to the famous Boulaak Museum at Cairo, Egypt, through which he secured the fine specimen of mummy and case, from the 20th dynasty, which he generously presented as a gift to the Academy. This young woman of royal blood, who has been carefully deposited in a glass case modeled after those in the Field Columbian Museum, adds much to the interest of visitors.

With the Peary expedition to Greenland, the past year, was a life-member of the Academy, Mr. George R. Putnam of the U. S. Coast and Geodetic Survey. He was granted leave of absence to accompany the expedition in the interest of science for the Massachusetts

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Institute of Technology. On his return he presented our museum with a fine specimen of an Eskimo kayak, together with a complete outfit of clothing and implements, all of which have seen actual service in Eskimo hunting and fishing. Among other donations to the museum was a valuble miscellaneous collection presented by Mrs. C. C. Parry. Richter & Son presented a unique specimen, the skin of a white skunk. A large number of stone implements have been received from Capt. W. P. Hall. Through Prof. Frederick Starr's interest the museum acquired by purchase a fine collection of Mexican pottery.

A particularly gratifying work has been done by the Publication Committee in so nearly completing Vol. VI. of the Proceedings. The paper on "A Revision of the Truxalinæ of North America," by Prof. Jerome McNeill, is in press and will soon be issued.

We have been asked during the past year to use our influence in the support of a congressional bill for the encouragement of the metric system. It seems strange to those who know its many advantages over other systems of weights and measures now in use that any opposition should be made to its use; least of all should we expect it from so distinguished a scientist as Mr. Herbert Spencer. His opposition to its use, published in a recent number of the *Popular Science Monthly*, has been ably answered in the same periodical by Prof. Mendenhall. Our Academy should exert its utmost influence to promote the general adoption of the metric system, and assist the metrological societies in distributing circulars of information on the subject.

The scientific societies of the District of Columbia have asked our coöperation in preventing the passage of a bill, in congress, against vivisection, or, more properly speaking, to restrict its use in the District of Columbia. Vivisection may be considered as one of the most efficient aids to medical science and its use in the hands of professional experts, for the advancement of science, should be unrestricted.

Our library should receive as prompt attention as possible. Binding and cataloguing are the two most pressing needs. In this connection some plan might be arranged for an interchange of books with the Library Association. This, however, cannot be accomplished until our library is catalogued. To the library should be added a reading-room well provided with current scientific periodicals. A number of these have been regularly received in the past. At the present time the number is too small for the actual requirements of students visiting the building

A slight attempt has been made during the year to awaken more interest at our regular monthly meetings by having a paper read on some scientific topic. We have had five such papers: the first at the January meeting was read by Dr. Edward Gudeman, whose subject was "An Historical Review of Chemistry;" at the February meeting Prof. J. A. Udden of Augustana College read a paper on "An Exploration of Mounds in Kansas;" Mr. F. J. Walz, U.S. Signal Observer, read a paper on "Methods of Forecasting" at the March meeting.

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In April, Prof. L. W. Andrews of the State University kindly gave us a lecture on "Some Phenomena Connected With Highly Rarified Gases." At the October meeting Mr. George R. Putnam gave a description of his experiences and study of Eskimo life while on the Peary expedition.

On looking over our membership list we find several additions the past year. We record with regret the loss of one of our earliest members, Mr. William Henry Holmes, who as Trustee and Vice-President, either in or out of office, was always an active member, with unbounded faith in the future prosperity and great usefulness of our organization. Prof. Charles Wachsmuth of Burlington, a distinguished palæontologist and one of our corresponding members, has also been taken from us. Our published volumes bear testimony to his untiring research in his chosen field.

In surrendering the office of President which you have generously imposed upon me for two successive years, may I thank you for the honor conferred and your willing coöperation in Academy work.

The presentation of these reports was followed by the election of officers for the ensuing year, resulting as follows:

President—EDWARD S. HAMMATT.

First Vice-President—Dr. A. W. ELMER.

Second Vice-President—C. A. FICKE.

Recording Secretary—E. M. WHITE.

Corresponding Secretary—Dr. W. H. BARRIS.

Treasurer—Mrs. M. L. D. PUTNAM.

Curator—Dr. W. H. BARRIS.

Librarian—C. E. HARRISON.

Trustees for Three Years—Dr. JENNIE MCCOWEN, EDWARD BORCHERDT, J. H. HARRISON, FRANK NADLER.

January 28, 1897—REGULAR MEETING.

Edward S. Hammatt, President, in the chair; five members present.

The report of the Librarian for January showed 126 books and pamphlets and 3 bound volumes received.

New members were elected as follows: Mrs. Nettie Howard, F. Fidlar, C. J. Von Maur, A. J. Smith.

Standing Committees for 1897 were appointed as follows:

Finance—W. C. Putnam, J. B. Phelps, J. H. Harrison.

Publication—Mrs. M. L. D. Putnam, Prof. W. H. Barris, Dr. Jennie McCowen, Prof. S. Calvin, Dr. C. H. Preston.

Archæology—C. E. Harrison.

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Geology and Palæontology—Prof. W. H. Barris.
Conchology—Miss S. F. Sheldon.
Chemistry—Frank Nadler.
Zoölogy—Dr. A. W. Elmer.
Botany—Louis Block.
Historical Collections—E. S. Ballord.
Library - Charles E. Harrison, Charles Francis, E. M. White.

The meeting then adjourned to hear the lecture on "Egypt," given by Mr. C. A. Ficke, under the auspices of the Academy, in the Presbyterian church. The seating capacity of the building was taxed to the utmost and all enjoyed the delightful and instructive account Mr. Ficke gave of his journey, illustrated by stereoptican views.

February 26, 1897—REGULAR MEETING.

Edward S. Hammatt, President, in the chair; seven members present.

The Librarian reported the receipt of 124 books and pamphlets and 9 bound volumes during February.

Report of Curator: An archæological specimen was received from Clarance B. Morse, from Ossabar Island, Bryan County, Georgia —a large, exquisitely-shaped urn. He says it was originally covered with an inverted bowl of earthenware. In it were the fragments of a skeleton of a small child. Much decayed.

Publication Committee reports Volume VI. of the Proceedings finished, except index, and 100 copies of Prof. McNeill's paper sent him.

Frank W. Garstang and A. Vere Martin were elected to membership.

A committee of two, consisting of Dr. C. H. Preston and C. E. Harrison, was appointed to revise the membership list, all being in arrears two years or more to be dropped from the roll.

A report by the Lecture Committee was made on the lecture given by Mr. Charles Francis, C.E., upon "Egyptology," February 24th:

The Library of the Academy was crowded. Mr. Francis illustrated his lecture by drawings and explanations of the hieroglyphics, and spoke at length upon the construction of the Egyptian monuments from an engineer's standpoint.

The Lecture Committee further reported that arrangements were in progress for future lectures.

The Library Committee was instructed to prepare and issue a card index with the forthcoming volume of Proceedings.

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March 26, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

Librarian's report for February showed 117 books and pamphlets and 4 bound volumes received.

The Curator reported that the only additions to the museum were three specimens of gold from Cripple Creek, Colorado.

April 30, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

The Librarian reported 121 books and pamphlets and 2 bound volumes received.

The Curator reported as follows:

A contribution from S. V. Proudfit, Washington, D. C., of a collection of stone implements from Mills County, Iowa, consisting of twelve boxes and six packages, numbered, labelled, and put up with the utmost neatness and care, accompanied with a complete catalogue of contents, and explanations of the same, equally painstaking and satisfactory. Two papers were also presented, "Antiquities of the Mission Bluffs" and "The Lodge Dweller," published by Mr. Proudfit.

Captain Hall reports the purchase from the mound fund of nine stone axes and thirty-seven flints from the vicinity of Rapids City.

The Corresponding Secretary was instructed to extend to S. V. Proudfit, over the seal of the Society, a vote of thanks for the valuable collection donated.

May 28, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

The Librarian reported 158 books and pamphlets and 15 bound volumes received.

The Curator reported a gift of two large boxes from C. B. Moore from the shell beds of Georgia. The first contained a characteristic burial vase, but crushed into fragments in transit. The second contained a large shell cup; a series of unlabelled chisels, cups and gouges, all made of shell; a collection of large shell beads; another of excessively large forms; fresh water shells, punched and used for ornaments; the shell known as *fulgus carica;* fragments of pottery to show pattern; box of charred bone remains.

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Captain Hall contributed one large celt and twenty flint implements purchased from the mound fund.

A committee consisting of Dr. C. H. Preston and J. H. Harrison, appointed to draft resolutions on the death of Mrs. Nettie F. Howard, reported as follows:

Resolved, That in the death of Mrs. Nettie Fidlar Howard, the efficient manager of the Davenport Associated Charities, on May 11, 1897, this Academy has lost a valued member whose life, active in good works, made her an honor to all with whom her lot was cast.

Resolved, That we sympathize with the bereaved relatives; that these resolutions be spread upon the records of the Academy and copies supplied to the local press.

C. H. PRESTON,
J. H. HARRISON, } *Committee.*

On motion, the President was authorized to procure a current copy of the "Naturalists' Directory."

No meetings were held in June or July.

August 27, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

The Librarian reported for June, July and August, 253 books and pamphlets and 20 bound volumes received.

The Curator reported the following additions to the museum in June:

A large, fine specimen of "*Tubipora musica*," and from the tropical seas the beautiful nautilus, known as the *Nautilus pompilius*, both donated by Mrs. Elizabeth Holmes.

In July: A beautiful specimen of Calcarcous Tufa from Oliver Allen, Jr., of Mumford, New York.

In August: A collection of thirty flint implements from Captain Hall, purchased by the mound fund.

Henry Vollmer was elected to membership.

The death of Mr. John C. Bills, a regular member, was announced, and a committee was appointed to prepare suitable resolutions.

September 24, 1897 — REGULAR MEETING.

Dr. C. H. Preston, Acting President, in the chair.

The Librarian reported 167 books and pamphlets and 13 bound volumes received.

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The Curator reported a gift from Rev. Irving M. Channon, missionary at Kusaie, Caroline Islands, of a noteworthy collection of interesting articles bearing on the character, life work and habits of the inhabitants of these islands, consisting of a model of a family canoe, with mast and rigging, from Montlock Islands; a model of loom and samples of thread from Kusaie Island; a tastefully made ornamented fan from Marshall Island; a mat from Gilbert Island; one belt, three clubs and a cane from Rük Island; three "tolls," or loin cloths, from Kusaie Island; two mats and cloth of bark from Rük Island; one set of ear-rings from Rük Island; one cocoanut shell cup from Rük Island; two baskets from Gilbert Island; one fashionable hat, sixteen ocean shells, one girdle used during pregnancy, seven photographs of natural scenery, villages, etc., from Caroline Islands; one necklace of ocean shells, one necklace of pandanis leaf, from Gilbert Island. Together they fill to overflowing a show-case donated by J. C. Tilton.

Rev. Mr. Demarest of Pena Blanca, New Mexico, and Rev. Irving Channon of Kuzaie, Caroline Islands, were elected corresponding members. A vote of thanks of the Academy was tendered Rev. Irving M. Channon for the valuable collection of South Sea curios presented.

November 26, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; six members present.

The Librarian reported for October and November 107 books and pamphlets and 5 bound volumes received.

In the Library of the Academy, George R. Putnam, of the United States Coast and Geodetic Survey, gave a lecture on Alaska and a description of his summer's work on the Pribylof, or Seal Islands in Behring Sea. He spoke of the habits of the natives of the Aleutian Islands as he came in contact with them, and also of the preservation and destruction of the seals. The lecture was illustrated by maps and specimens from the collection of the Academy.

December 31, 1897 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; seven members present.

The Librarian reported 112 books and pamphlets and 4 bound volumes received.

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The application for life membership of E. K. Putnam was received.

The Presbyterian Church property, corner of Seventh and Brady Streets, being in the market, it was moved and carried that if the Academy could find ways and means of doing so, it be purchased.

The President appointed as Nominating Committee for officers for 1898, E. M. White, Dr. C. H. Preston and Frank Nadler.

January 5, 1898 — Annual Meeting.

Edward S. Hammatt, President, in the chair; eight members present.

The minutes of the annual meeting, January 6, 1897, were read and approved.

TREASURER'S REPORT.

RECEIPTS.

Balance on hand, January 1, 1897	$140.29	
From F. Nadler, Treasurer, 1896	43.96	
Annual subscriptions	285.00	
Donations	30.00	
Dues	183.00	
Initiation fees	20.00	
Lectures and receptions	30.00	
Door receipts	49.98	
Interest	133.44	
Total receipts		$915.67

EXPENDITURES.

Paid Dr. W. H. Barris, Curator	$500.00	
Janitor	84.25	
Fuel	61.54	
Lights	11.86	
Water	12.00	
Repairs and improvements	116.46	
Clerical assistance	13 35	
Chairs	25.00	
Printing, stationery, etc	24.10	
Captain W. P. Hall, for collecting	5.00	
Postage, express and incidentals	48.25	
Total expenses		$901.81
Balance on hand		$ 13.86

Respectfully submitted,
MARY L. D. PUTNAM, *Treasurer.*

STATEMENT OF ENDOWMENT FUNDS OF THE ACADEMY.

General contribution fund, raised 1883, drawing interest at 7 per cent	$ 1,200.00
Bequest of Mrs. J. Monroe Parker, payable when $5,000 has been raised for building purposes	1,000.00

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Bequest of J. Monroe Parker		1,000.00
Putnam Memorial Fund for endowment of publication, established by Mrs. Mary L. D. Putnam with funds bequeathed by Mrs. Mary Putnam Bull		9,500.00
		$12,700.00

RECAPITULATION.

Receipts General Fund	$915.67	
Publication account	772.58	
Grand total receipts		$1,688.25
Expended General Account	$901.81	
Publication account	760.80	
Grand total expenditures		$1,662.61
Balance on hand, General Account	$ 13.86	
Publication Account	11.78	$ 25.64
		$1,688.25

Respectfully submitted,

January 1, 1898. MARY L. D. PUTNAM, *Treasurer.*

The Treasurer's report was ordered referred to the Auditing Committee.

For the year 1897 correspondence was as follows: Letters received, 184; letters and acknowledgments made, 241.

Very respectfully,

W. H. BARRIS, *Corresponding Secretary.*

REPORT OF RECORDING SECRETARY.

During the year 1897 there have been twelve regular meetings of the Academy. The average attendance has been six.

Seven regular, one life, and three corresponding members have been added during the year.

Two members have died: Hon. John C. Bills and Mrs. Nettie F. Howard.

Lectures have been delivered by C. A. Ficke on "A Trip Up the Nile;" by Charles Francis on "Egyptian Hieroglyphics," and by George R. Putnam on "The Seal Islands and Alaska."

E. M. WHITE, *Recording Secretary.*

LIBRARIAN'S REPORT.

Your Librarian would report for the year just closed a very satisfactory condition of the Library. At the beginning of the year the Trustees made a small appropriation for binding, a work greatly needed for the preservation of very many valuable books; but owing to a pressure of funds necessary in other directions the money was not called for. The only expense incurred was about twenty-five dollars expended in classifying and arranging the Library, a work made necessary after the new shelving was put in last year. Much credit

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must be given Professor Barris and Mr. Robert P. Osborn for the extensive work accomplished by them in this department. The number of books and pamphlets received since my last annual report is 1,519, 76 of which are in substantial permanent binding. That the members may more fully understand the rare value of our library, I have prepared and herewith submit a partial list of societies in this country from which we receive books in exchange:

Harvard University, Canadian Journal of Science, National Science Association of Staten Island, Scientific Association of University of Missouri, Boston Society of Natural History, New York Botanical Garden, Canadian Institute, Chicago Academy of Science, Texas Academy of Science, Johns Hopkins University, State Historical Society of Wisconsin, Minnesota Historical Society, Portland Society of Natural History, Kansas Academy of Science, American Antiquarian Society, American Academy of Arts and Sciences, St. Louis Academy of Sciences, American Philosophical Society, American Museum of Natural History, Colorado Scientific Society, Torrey Botanical Club, Harvard College, University of California, Illinois Museum of Natural History, Philadelphia Academy of Science, Zoölogical Society of Philadelphia, Chicago Historical Society, Field Columbian Museum, California Academy of Science, Entomological Publication, National and State Geological Surveys and Reports, Reports on Forestry, Botany, Chemistry, Experiment Stations, Animal Industries, etc., from the Department of Agriculture, Patent Office Gazette, Fish Commission, Coast and Geodetic Surveys, Smithsonian Reports, etc., in all, about one hundred societies and departments.

From foreign countries we receive exchanges as follows: Canada, Mexico, Africa, 3; South America, 15; Asia, 1; Australasia, 5; Austro-Hungary, 13; Belgium, 9; Denmark, 2; France, 31; Germany, 45; England, 14; Ireland, 3; Scotland, 9; Italy, 12; Netherlands, 3; Norway, 7; Portugal, 2; Russia, 4; Spain, 1; Sweden, 7; Switzerland, 11; Bulgaria, 1; in all, 198 foreign Societies contributing regularly through exchange for our publications to the building up of this vast storehouse of scientific lore. I have in previous reports urged the necessity of binding and indexing, a work requiring considerable time and expense to complete. I trust the Academy will speedily enter upon this most important work.

Respectfully submitted,

C. E. HARRISON, *Librarian.*

REPORT OF PUBLICATION COMMITTEE.

Your Committee on Publication reports as follows:

Early in the past year, Vol. VI. of the Proceedings, begun in 1892, was brought to completion, and the usual edition of 1,500 copies, with 200 separate for authors, was printed. Of these 374 have been distributed to home and foreign exchanges and to regular members, and

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the remainder are stored in the Academy building. The volume has been very favorably received, and, we believe, fully sustains the reputation of its predecessors. Of its ten papers the most important are those on entomology, contributed by Prof. Jerome McNeill, of the University of Arkansas, and Prof. H. F. Wickham, of the State University of Iowa, and a summary of the archæology of Iowa by Prof. Frederick Starr, of the University of Chicago. The illustrations of the volume comprise six entomological plates, a number of wood cuts, and an engraved portrait of Dr. C. C. Parry accompanying a biographical sketch by Dr. C. H. Preston, and a list of his published writings. The synopsis of Proceedings is brought down to the beginning of the year 1897 and a comprehensive index is appended. One hundred and ninety-two pages of the three hundred and ninety-two pages of this volume were printed during the past year; also the first forty-four pages of Vol. VII. Forty more are now ready for the press. The first paper in Vol. VII. is "A Memoir (with portrait) of Charles Edwin Putnam," by W. C. Putnam; the second an article on "Our Local Geology," by Prof. W. H. Barris, and the third, "A Study of the Census of the Pueblo of Cochite, New Mexico," by Prof. Frederick Starr. A fourth paper which, with its illustrations, will cover about sixty pages additional, and which is the joint contribution of Prof. Herbert Osborn, entomologist of the Iowa Experiment Station at Ames, and Mr. Elmer D. Ball, is all in type. It is entitled "Studies of North American Jassoidea," and is a continuation of papers presented before the Iowa Academy of Science entitled "Contributions to the Hemipterous Fauna of Iowa." This valuable paper will be illustrated by six plates, the expense of which is met by the Experiment Station.

The financial report of the publication for the year is as follows:

RECEIPTS.

Balance on hand January 1, 1897	$ 20.79	
From interest on Putnam Fund to February 1, 1898	712.50	
Interest on bank deposits	6.29	
Sale of publications	8.00	
Donation	25.00	
Total receipts		$772.58

EXPENDITURES.

Paid Printing	$385.80	
Plates	275.00	
Clerical work	100.00	
Total expenditures		$760.80
Balance on hand		11.76
		$772.58

Respectfully submitted,

MARY L. D. PUTNAM,

Chairman Publication Committee.

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Dr. W. H. Barris was called to the chair and the President's address was read.

PRESIDENT'S ANNUAL REPORT.

EDWARD S. HAMMATT, January 5, 1898.

MEMBERS OF THE ACADEMY, LADIES AND GENTLEMEN:

Much occurs each successive year in the life of scientific bodies which is but a repetition of the work of past years. We therefore find a great sameness in regular reports. Yet it is only by such detailed reports that the outside world can judge of our right to live.

We have a fair-sized membership, among whom are a few with genuine interest in scientific matters. But the greater number are quite too indifferent to the pleasure and benefit of attendance upon the regular meetings of the Academy.

It has been suggested that we change our regular monthly to quarterly or less frequent meetings, at which the only business should be the reading and discussion of topics of scientific interest. We find that some years ago a resolution was adopted providing for one hour of scientific discussion at each regular meeting. If this resolution were revived and notice of the subject of discussion sent to each member it would certainly give greater interest to our meetings and increase the attendance. We see from the reports of the Finance Committee and Treasurer that the Academy finances have been judiciously managed during the past year. There has been an encouraging growth in the museum collections. The most notable specimens were added to the department of ethnology and consisted of native work from the South Sea Islands, collected and presented to the Academy by the Rev. Irving M. Channon; also a collection made by Mr. E. K. Putnam in Norway, Sweden and England, of native implements, mineralogical specimens and a Norwegian burial urn. Mr. George R. Putnam presented us with many interesting specimens collected while on the Aleutian Islands the past summer. The museum has been enriched by two fine specimens of ornamented burial cases, and a large number of stone implements from Georgia, presented by Mr. Clarence B. Moore of Philadelphia. Mr. S. V. Proudfit presented the Academy with a large collection of stone implements.

Mention must also be made of hundreds of Indian implements, secured through the generous interest of Capt. W. P. Hall. Beside these, we have received many smaller donations of specimens from various sources. It may be well to remember that the value of a museum is greatly enhanced by the exercise of judicious care in the selection of specimens. As this becomes annually more apparent from lack of space, a careful revision of specimens in each department of the museum should be made by the Museum Committee, with recommendations to the Academy for the removal of such as can be dispensed with. This will serve to increase the value of our collections and somewhat relieve our overcrowded shelves. It is hoped that during

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the coming year we may secure a series of specimens from the United States Geological Survey arranged for distribution for educational purposes. Application has been filed with the Survey for this series. The Library has received many valuable additions by exchange with foreign Scientific Societies. Special mention must be made of a series of government publications, giving the Messages and State papers of the Presidents of the United States. This set of books was secured through the interest of Hon. G. M. Curtis, to whom the Academy is indebted for this and other acts of courtesy. We take pleasure in recording the completion, early in the year, of Vol. VI. of the Academy Proceedings. Several papers of importance have also been published since our last annual meeting, as parts of Vol. VII. of the Academy Proceedings. These papers are, "A Memorial of Mr. C. E. Putnam," one of our former Presidents, written by his son, Mr. W. C. Putnam; a paper on "Our Local Geology," by Prof. W. H. Barris, a paper called "A Study of a Census of the Pueblo of Cochiti, New Mexico," by Prof. Frederick Starr, and a paper entitled "Studies of North American Jassoidea," by Prof. Herbert Osborne and Prof. E. D. Ball. We have had several interesting and instructive lectures during the year, the first by Hon. C. A. Ficke, describing his trip up the Nile the preceding year. This was followed by a lecture by Mr. Charles Francis on "Egyptian Hieroglyphics." Upon the return of Mr. George R. Putnam from his summer work for the United States Coast and Geodetic Survey on the Pribyloff Islands, he gave us an interesting lecture on "The Seal Islands and Alaska."

It is with regret that we record the loss of two of our members during the past year. In the death of Hon. John C. Bills the city mourns one of its most honored and influential citizens, and the Academy, a warm advocate and friend, while in the untimely death of Mrs. Nettie Howard the Academy loses an interested, active member.

At the last annual meeting two honorary members were elected and during the year one life member, three corresponding and seven regular members.

We have but lately passed our thirtieth anniversary. Of those who met and organized the Davenport Academy of Natural Sciences on the 14th day of December, 1867, few are with us now. But we have before us in the work accomplished a glowing tribute to the founders of the Academy. In glancing backward over this period we cannot but feel, with the limited means at our disposal, we have won an honorable position in the scientific world and have stamped a character on this fair city such as no other organization in our midst has done. In exchanging our publications with Scientific Societies in every part of the world we are doing a work which continually redounds to the honor of this community. When this work is fully appreciated by our citizens we shall have the generous recognition to which we are entitled.

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On motion a vote of thanks was tendered Hon. George M. Curtis for securing a set of "The Messages and Documents of the Presidents of the United States" for the Academy.

Honorary members elected:

Henry B. Osborn, of Iowa Experimental Station, Ames, Iowa.

Prof. B. F. Fernow, Chief Division of Forestry, Washington, D. C.

Dr. John S. Billings, Surgeon General U. S. A., Washington, D. C.

Dr. Henry S. Pritchell, Superintendent United States Coast and Geodetic Survey, Washington, D. C.

Prof. Robert Etheridge, National Museum, South Kensington, England.

Life member, E. K. Putnam.

The Nominating Committee reported the following list of nominations for officers for 1898:

President — EDWARD S. HAMMATT.
First Vice-President — Dr. A. W. ELMER.
Second Vice-President — C. A. FICKE.
Recording Secretary — E. M. WHITE.
Corresponding Secretary — Prof. W. H. BARRIS.
Treasurer — Mrs. M. L. D. PUTNAM.
Trustees for Three Years — Dr. W. L. ALLEN, C. A. FICKE, Dr. C. H. PRESTON, J. B. PHELPS.
Trustee to Fill Vacancy — Prof. W. H. BARRIS.

On motion of Rev. A. M. Judy the Secretary was instructed to cast the ballot of the Academy for officers as reported by the Nominating Committee, which was done, and they were declared elected.

Prof. H. B. Osborn being present, the President called on him for a short talk, which he gave on the San José scale.

January 7, 1898 — TRUSTEES' MEETING.

Edward S. Hammatt, President, in the chair; seven Trustees present. The Minutes of the Trustees' meeting, January 23, 1896, were read and approved.

A general discussion followed on the outlook of the Academy.

Mrs. Putnam, as Treasurer, made a verbal report that no indebtedness exists against the Academy.

Mr. C. A. Ficke suggested the Academy offer the Trustees of the Presbyterian Church the sum of $3,500 for the adjoining lot south of the Academy, and that the Church provide five life members.

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January, 28, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; five members present. Minutes of previous meeting read and approved.

The Librarian reported 104 books and pamphlets and 3 bound volumes received.

Report of Curator: The only addition made to the museum this month is from Mr. Edward Staunton, who gathered some excellent specimens of common mica from Mt. Pisgah, in the Adirondacks near Saranac Lake, New York. The crystals are of a peculiar form. The associated minerals are at present undetermined.

Moved and carried that the metric system of weights and measures be hereafter required by the Academy in all records, labels and articles for publication.

New members were elected as follows: Miss R. Renwick, Miss M. Renwick, William M. Lillis.

Mr. E. K. Putnam was invited to give a talk at the regular February meeting on the "Stone Age in Scandinavia," illustrated by specimens in the Academy.

A cast of an Egyptian hieroglyphic was presented by Sigsmund Shalon, representing Horus offering the Key of the Nile to Amor Ra.

The President appointed the following Committees for 1898:

Archæology — C. E. Harrison.
Geology — Prof. W. H. Barris.
Conchology — Miss S. F. Sheldon.
Zoölogy — Dr. A. W. Elmer.
Botany — A. A. Miller.
Entomology—Prof. H. B. Osborn.
Finance—J. B. Phelps, C. A. Ficke.
Publication — Mrs. M. L. D. Putnam, Prof. W. H. Barris, Dr. Jennie McCowen, Prof. S. Calvin, Dr. C. H. Preston.
Library — C. E. Harrison, Charles Francis, E. M. White.

January 28, 1898 — TRUSTEES' MEETING.

Edward S. Hammatt, President, in the chair; four members present.

The resignation of Ferdinand J. Walz, owing to removal from the city,

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was tendered and accepted. As insurance expires on the 30th, it was recommended that insurance be placed as follows:

Building	$1,500.00	
Cases and furniture	500.00	
Collections	2,000.00	
Library	1,000.00	$5,000.00

February 25, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; six members present. The minutes of the previous meeting read and approved.

The Librarian reported 133 books and pamphlets and 24 bound volumes received.

The Curator reported an addition to the museum of an old-time pair of spectacles (silver frame) with metal case, donated by Miss C. M. Holmes.

J. H. Hass was elected to regular membership and A. A. Miller to corresponding membership.

The president reported progress on the cataloguing of the Library.

March 25, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; six members and two visitors present.

The Librarian reported 164 books and pamphlets and 27 bound volumes received

The Curator reported: The Academy is again under obligations to Clarence B. Moore for the addition to its museum of an unusually large fossil oyster from Griffin's Landing, Burke County, Georgia, found on the Savannah River, 147 miles above Savannah.

There was a discussion on the importance to the Academy of securing manuscripts, books, pamphlets, newspapers, prints and other matter bearing on local history, it being pointed out that the Academy has a large amount of such material on hand and that the present time is the best for making the collection more complete.

March 31, 1898 — CALLED MEETING OF THE TRUSTEES.

The Trustees met at the Academy at 4:30 P. M; six members present. On motion, Hon. C. A. Ficke was made Chairman and Edward Borcherdt Secretary.

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The following resolution by C. E. Harrison was adopted:

Resolved, That the Davenport Academy of Natural Sciences hereby expresses its appreciation and full satisfaction with the arduous work of Miss Alice M. Beach in arranging the Academy library for cataloguing its contents.

Mrs. Putnam, as a Committee of one, reported concerning the purchase of the Presbyterian Church property. The Trustees of the church offered the property for $6,000, $500 to be paid when the Academy takes possession.

The following resolution by Dr. C. H. Preston was adopted:

Resolved, That Mrs. M. L. D. Putnam, Mr. C. A. Ficke and Maj. G. P. McClelland be appointed a committee with power to act in the matter of the purchase of the Presbyterian Church property, corner of Brady and Seventh streets.

April 30, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair. The minutes of the previous meetings read and approved.

Treasurer's report received and placed on file.

The Librarian reported 148 books and pamphlets and 10 bound volumes received.

In addition to those thus obtained by way of exchange, other important accessions have been made. The whole entomological library known as that of J. Duncan Putnam's has been formally catalogued and numbers 270 volumes.

From a private library sixty-seven volumes have been received. A collection of sixty-one volumes, mostly government publications, some of them extremely rare, was contributed by Dr. S. C. Bowman of Andalusia; from Prof. Barris we have forty volumes, mainly on geology and palæontology, none of which were previously in the library—a total of 596.

The Curator reported the following additions to the museum from Dr. S. C. Bowman of Andalusia: One pair of exquisitely prepared and mounted deer-horns, two large birds separately mounted, two cases of birds, the larger containing twenty-six, with name and locality of each; the smaller, seven; also alcoholic preparations of reptiles from western Texas and Mexico.

Capt. Hall reports the purchase of a stone axe and thirty-seven flint implements, paid for from the mound fund.

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E. H. Whitcomb and A. A. Miller were elected to regular membership (the latter from corresponding membership).

May 28, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; six members present.

George M. Bechtel was elected to regular membership.

Prof. Barris, appointed to draft resolutions on the death of Dr. Samuel C. Bowman of Andalusia, Illinois, reported as follows:

Resolved, That in the death of Dr. S. C. Bowman of Andalusia the Academy has lost a most generous and worthy member — one who for years has contributed largely to its museum. As a slight tribute to his memory we place on record our hearty appreciation of his many and valuable services. To friends and relations of the deceased, at home and abroad, we extend our most hearty sympathy.

W. H. BARRIS, *Committee.*

Drs. Allen and Preston were appointed a committee to draft resolutions on the death of William Stevens Perry, Bishop of Iowa, and reported:

WHEREAS, This Academy has lost in the death of William Stevens Perry, Bishop of the Episcopal Church in Iowa, an able and honored member, be it

Resolved, That this Academy place on record this testimonial of regard for the high literary ability and intellectual power of Bishop Perry, and as a token of appreciation of the high degree of education and professional eminence he attained.

Resolved, That in tribute to his memory these resolutions be inscribed upon our records and a copy thereof be sent to his bereaved niece.

WILLIAM ALLEN.
C. H. PRESTON. } *Committee.*

The Librarian reported 120 books and pamphlets and 34 bound volumes received. Of these bound volumes 24 are from the Department of Agriculture to complete sets; the balance come by way of exchange.

The Curator reported the following additions to the museum: From Mrs. Dr. C. C. Parry, a collection of Dr. Parry's botanical papers; a series of pressed botanical specimens; one box containing nearly forty species of minerals, fossils, etc., mostly labelled; an extraordinary pre-historic relic; obsidian arrow-points from Mexico; nest of five small species of iris from California; glassful of broken shells from shell bank; forms of *doscirna* and *ophivaroid* from the Pacific coast; a sack made in Mexico from native fibre; example of plain, modern pottery; three tourists' thermometers.

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June 24, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair. The minutes of previous meeting read and approved.

The Librarian reported 132 books and pamphlets and 5 bound volumes received.

The Curator reported: The Academy has received from Mrs. M. L. D. Putnam a small collection of ocean shells from Cape Cod. Seven or eight species are new to our collection.

Rev. J. B. Donaldson was elected to life membership.

A paper by Prof. Frederick Starr on "Notched Bones from Mexico" was received for publication.

September 30, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

The Librarian reported 355 books and pamphlets and 15 bound volumes received.

The Curator reported additions to the museum as follows: In July, from Capt. Hall, a collection of flint implements and three stone axes, from the mound fund. Mr. Webb Ballord donated a collection of 140 birds' eggs, unclassified. Mrs. H. M. Mandeville has presented a collection of mounted birds; also jars containing a centipede and tarantula; also a spinning-wheel for spinning flax.

In August, Mrs. M. D. Westlake presented a Japanese opium pipe.

In September, Capt. Hall contributed from the mound fund a small collection of pre-historic implements. Among these are a peculiar shaped stone gouge, one side concave the other grooved for attachment to handle; one small hematite axe; eight flints; a small collection of fossils from the Port Byron limestone and a modern knife of red pipestone. An extraordinary fine stone implement was contributed by W. R. Minnist of Gratz, Kentucky, through Mr. J. H. Harrison.

October 28, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair.

The Librarian reported 110 books and pamphlets and 7 bound volumes received.

The Curator reported as follows: Mrs. H. M. Mandeville has donated to the museum a medium-sized vase found in a mound on the Mandeville farm near this city. The neck bears two opposite handles, alternating with two projections, the whole peculiarly ornamented. To George M. Croft of Summitville, Iowa, the Academy is indebted for

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the gift of eighteen species of ocean and fresh water shells, twenty fine specimens of minerals and three fossils from Carbon County, Wyo.

Papers by Prof. H. B. Osborn on "Entomology of New Mexico," and by Prof. T. D. A. Cockerell on "The Genus Pediopsis," were presented and read by title.

The President appointed a committee for the nomination of officers for 1899, consisting of Edward S. Hammatt, Prof. W. H. Barris, and E. M. White.

November 28, 1898 — REGULAR MEETING.

Edward S. Hammatt, President, in the chair; six members present.

The Treasurer's report was received and placed on file.

The Librarian reported 122 books and pamphlets and 5 bound volumes received.

The Curator reported as follows:

The Academy has received from Dr. Samuel H. Scudder an addition to its entomological collection of three specimens of the rare *Stagnanles Carolina*, which he has recently described. Mr. Joseph Parry has donated an interesting series of minerals comprising actinolite, both in crystalline and massive forms, the same with steatite and garnets; steatite quartz in massive as well as clusia forms. Iron pyrites, incrusting mineral and calcite, mainly from Vermont. There are also two imperfect stone axes from Fort Edwards. A curiosity of some interest is a cake of Bayberry tallow; also a candle made of it, Mr. Parry thought in use on Long Island prior to the use of oil, gas or ordinary tallow.

From Mr. Dunbar D. Beck the Academy has received an interesting series of calcareous concretions of spherical form. They are most generally found imbedded in thick sandstone and of the carboniferous age. Deserving a place in the Historical Department of the Academy is a piece of Uncle Sam's Santiago war balloon, presented by Sergeant John A. Miner of the U. S. Signal Service, with account of the same.

December 30, 1898 — REGULAR MEETING

Edward S. Hammatt, President, in the chair.

The Librarian reported 105 books and pamphlets and 3 bound volumes received.

The Curator reported deposited by Webb Ballord a jar of crinoids gathered on the Bahama expedition, of which he was a member, and dredged from the same localities in which Prof. Alexander Agassiz found his first living crinoids.

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Received of Prof. H. F. Wickham of the Iowa State University nearly two hundred specimens of *coleoptera* from the Lake Superior regions. They are of special interest to the Academy as part of the material treated of in the Proceedings published two years ago (Vol. VI., pages 125-169).

A committee consisting of Rev. J. B. Donaldson, Mrs. M. L. D. Putnam and Dr. C. H. Preston was appointed to draft resolutions of regret on the death of Maj. G. P. McClelland and to report at the next meeting.

The Recording Secretary was instructed to write to Mr. Willliam H. Ballou of New York City that the probabilities were the Academy would be represented by active members at the Eighth International Geological Congress, to be held in Paris in 1900, and his appointment as a representative could not at present be considered.

REPORT OF THE CURATOR FOR THE YEAR 1897.

Additions were made to the museum as follows:

From Clarence B. Moore, Philadelphia, a burial urn from Mound A., Middle Settlement, Ossabar Island, Bryan County, Georgia. It had been originally covered with an inverted bowl of earthenware, over the fragments of a skeleton of a small child, much decayed.

Three specimens of gold in quartz from Cripple Creek, donor unknown.

From Capt. Hall, purchased by the Mound Fund, nine rather rough stone axes, and thirty seven flint implements from Pleasant Valley.

From Mr. J. V. Proudfit of Washington, D. C., a collection of stone implements from Mills County, Iowa. They are contained in twelve small boxes and six packages, numbered, labelled, and put up with the utmost care A catalogue accompanies the gift, with notes. Also two papers written by the giver, entitled "Antiquities of the Missouri Bluffs," and "The Cave Dwellers."

From Capt. Hall, purchased with funds from the Mound Fund, one large celt and twenty-two flint implements.

From Clarence B. Moore, two boxes. The first contained another burial urn, somewhat crushed in transit, but completely restored by Mr. Charles E. Harrison. The second contained one large drinking vessel, twelve smaller forms, one box of ordinary shell beads, another of extraordinary large forms, thirteen cores of conch shells, one package fragments of pottery, one box of burned human bones, one box of river shells each pierced at the apex, five specimens of the *Fulgar canaca* perforated and showing wear at the beaks, one fine stone celt and two fragments of rock, all labelled, giving localities where found, and their marks and peculiarities.

From Mrs. Margaret Holmes, a large specimen of the coral known as the *Tubipora musica*; also a specimen of the *Nautilus pompilius* of Linnæus.

A small collection of flint implements—about thirty—from Capt. Hall.

J. C. Tilton donated to the Academy, for its Museum, a case and stand.

From Oliver Allen of Mumford, N. Y., specimens of *Calcareous tufa*, of which their church was built.

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From the Rev. Irving M. Channon, missionary to and residing at Kusaie, one of the Caroline Islands of the Micronesian Group, an interesting collection bearing upon the life, work, and habits of the inhabitants. The following is a list: A model of the family canoe, from the Montlock Islands; a loom, work, and samples of thread from the Kusaie Islands; three tols or loin cloths woven and from the Kusaie Islands; a fan, figured and embroidered, from the Marshall Islands; two baskets, a mat, and a hat, from the Gilbert Islands; a belt, three clubs, a cane. two mats of cloth of bark, a set of ear-rings and a cocoanut cup from the Ruk Islands; sixteen ocean shells, and a girdle used in pregnancy, from the Caroline Islands; a necklace of shells, another of pandanus leaf, from the Gilbert Islands; seven photographs of buildings, church, and natural scenery.

From George R. Putnam, a collection from Alaska: lava, augite crystals and sand from St. Paul's Island; tooth of the walrus, teeth of the sea-lion and fur seals; the skull of a young seal, and a bag made from the intestines of the sea-lion; fire-making apparatus from the Eskimo settlements of North Alaska; two remarkably fine sea urchins from the Aleutian Islands; collection of ocean shells from Japadui Bay; basket and tobacco pouch from Otter Island. Mr. Putnam also presented what was thought to be the hardened cartilage that separates the vertabra of the whale.

From Mr. Edward K. Putnam, specimens of pottery and a burial urn ornamented and enclosing charred human remains; one bronze axe, one grooved stone hammer, another pierced for a handle, two large celts, one elongated spear, a shorter form, one three-sided, slightly built and delicate, three curved flint knives, and two small arrow points, mainly from Denmark.

From Mrs. Putnam, an anemonite from Whitby, England; specimens of hematite from Lake District, west coast of England; four large specimens from the Cleatore Ore Mine; thirty-seven choice specimens including various hematitic forms with crystals of quartz, fluor-spar and associated rock; a sea urchin from the Isle of Guernsey; garnets from Norway.

From Miss L. Dickenson, Sunderland, England, a box of native wood decorated by burnt etching; a fine model of Nansen's last sled.

From Clarence B. Moore, for framing, a lithograph of a large cinerary urn showing as contents human bones, the cranium, limbs, and upper ribs, accompanied with large shell beads.

From Capt. Hall, a large grooved stone axe, an equally large celt, and over seventy flint implements, with grooved axe and flints collected by Samuel and Isaac Wainright.

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ELECTIONS TO MEMBERSHIP.

DECEMBER 14, 1867, TO JUNE 1, 1899.

HONORARY MEMBERS.

* Deceased

*Baird, Spencer F., Wash., D.C. Apr. 27, '77
Billings, J. S., New York City.... Jan. 5, '98
Calvin, Samuel, Iowa City, Ia... Jan. 18, '99
*Carpenter, W. B., London, Eng.. Jan. 3, '77
*De Candolle, Alphonse, Geneva, Switzerland..... Jan. 3, '77
Etheridge, Robert, South Kensington, Eng..... Jan. 5, '98
Fernow, B. E., Ithaca, N. Y..... Jan. 5, '98
*Gray, Asa, Cambridge, Mass ... Jan. 3, '77
*Hagen, H. A., Cambridge, Mass. Jan. 2, '84
*Henry, Jos., Washington, D.C... Jan. 3, '77
Hooker, Joseph D., Kew, Eng... Jan. 3, '77
*Kirtland, J. P., Cleveland, O.... Jan. 3, '77
*Le Conte, J. L., Philadelphia, Pa. Jan. 3, '77
McBride, T. H., Iowa City, Ia... Jan. 18, '99
Moore, C. B., Philadelphia, Pa... Jan. 2, '95
Nutting, C. C., Iowa City, Ia.... Jan. 18, '99
Osborn, Herbert, Columbus, O... Jan. 5, '98
Pritchett, H. S., Washington, D.C. Jan. 5, '98
Starr, Frederick, Chicago, Ill.... Jan. 7, '96
*Westwood, J. O., Oxford, Eng... Jan. 3, '77

CORRESPONDING MEMBERS.

It has been found impracticable to designate the deceased in this list

Abbott, C. C., Trenton, N. J.... Apr. 27, '77
Agassiz, Alex., Cambridge, Mass. Apr. 27, '77
Allen, J. A., Cambridge, Mass.. Apr. 27, '77
Andrews, Dr. Edm, Chicago, Ill. Apr. 27, '77
Arthur, J. C., Charles City, Ia... Nov. 23, '76
Atwood, H. F., Chicago, Ill.....
Austin, E. P., Cambridge, Mass. Apr. 27, '77
Ayers, E. C., Champaign, Ill..... Jan. 4, '68
Ayers, Miss M. O., Champaign, Ill. Jan. 4, '68
Babcock, Prof. H. H., Chicago. Sept. 24, '88
Backmann, Dr. J, Berne, Switz. Dec. 29, '82
Ballou, W. H., New York City. Mch. 26, '97
Bamps, Anatole, Brussels, Belg.. Jan. 31, '79
Bannister, Jas., New York City. Dec. 31, '80
Barbee, Dr. W. J., Carrolton, Miss. (transferred)..... Apr. 3, '68
Barcena, Mariano, City of Mexico, Mexico..... Mch. 29, '78
Barfoot, Joseph L., Salt Lake City, Utah..... July 28, '76
Barler, Prof. O. L., Upper Alton, Illinois ..... Jan. 25, '68
Barnard, Chas., Waukon, Ia ... June 30, '82
Barr, S. S., Walnut Grove, Ia.. Mch. 26, '80
Barroeta, Dr. Gregorio, San Luis Potosi, Mexico ..... Mch. 29, '78
Barrois, Dr. Chas, Lille, France. Jan. 31, '79
Baylies, Rev. Henry. ..... Feb. 22, '68
Beach, Miss Alice, Urbana, Ill. Mch. 25, '98
Behr, Dr. H., San Francisco, Cal. July 28, '76
Behrens, J. H., San Francisco, Cal. Apr. 27, '77
Belfrage, G. W., Clifton, Texas. Apr. 27, '77
Bendix, Chas., Franklin, Cal... Feb. 23, '83
Berthoud, E. L., Golden, Col... Apr. 27, '77
Bessey, Prof. C. E., Ames, Ia... Apr. 27, '77
Bethune, Rev. C. J. S., Port Hope, Ontario..... Apr. 27, '77
Bidwell, Gen. J., Chico, Cal ... Dec. 29, '82
Binney, W. G., Burlington, N. J. Apr. 27, '77
Blackshaw, Dr., Urbana, Ill..... Jan. 4, '68
Bland, Thos., New York City... June 28, '78
Blatchford, E. W., Chicago, Ill.. July 28, '76
Bliss, H. S., Galena, Ill. ... Jan. 25, '68
Bolander, H. N., San Fr., Cal.. Mch. 12, '69
Bradley, Dr. C. C., Manchester, Iowa ..... Sept. 26, '79
Brandigee, T. S., Cañon City, Col. Apr. 27, '77
Brendel, Dr. Emil, Tremont, Ill. Apr. 25, '79
Brendel, Dr. Fred., Peoria, Ill.. June 29, '77
Broadhead, G. C., Pleasant Hill, Missouri ..... July 28, '76
Brous, H. A., Manhattan, Kans. Apr. 27, '77
Burgess, Edw., Boston, Mass... Apr. 27, '77
Burgess, Rev. R., Ames, Ia .. Apr. 27, '77
Burnell, Levi, Milwaukee, Wis. Mch. 14, '68
Butler, J. D., Madison, Wis. .. Apr. 27, '77
Byers, W. N., Denver, Col..... Mch 12, '69
Byrnes, Dr. R. M., Cincinnati, O. Apr. 27, '77

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Calkins, W. W., Chicago, Ill....Jan. 25, '78
Calvin, Prof. S., Iowa City, Ia..Apr. 27, '77
Canby, W. M., Wilmington, Del.Apr. 27, '77
Cardwell, Dr. J. R., Portland, Or.Nov. 5, '80
Carpenter, Dr. H., Portland, Or. Nov. 5, '80
Carr, Lucien, Cambridge, Mass Apr. 27, '77
Caton, J. D., Ottawa, Ill.....Apr. 27, '77
Chambers, V. T., Covington, Ky.Apr. 27, '77
Channon, Rev. Irving M., Kusaie, Caroline Islands..... Sept. 14, '97
Chapman, Dr. A. W., Apalachicola, Florida.....June 29, '77
Chapman, W. A., Okalona, Ark.Nov. 27, '85
Christopher, J. W., New York..Dec. 31, '80
Clarke, Robt.. Cincinnati, O ..June 29, '77
Claypole, Dr. E. W., Antioch Col, Ohio.....Nov. 5, '80
Cleveland, D., San Diego, Cal..June 29, '77
Clinton, G. W., Buffalo, N. Y...Mch. 12, '69
Cochran, Miss Abbie, Monterey, Mexico.....Feb. 28, '79
Coffeen, Miss Olive E., Minneapolis, Minn. .....Feb. 25, '87
Collett, Prof. O. W., St. Louis, Missouri.....Apr. 27, '83
Comstock, Prof. J. Henry, Washington, D. C.....June 24, '81
Comstock, T. B., Ithaca, N. Y...Apr. 27, '77
Condon, Prof. C., Portland, Or..Nov. 5, '80
Conrad, T. A., Philadelphia, Pa.Apr. 27, '77
Cook, Prof. A. J., Lansing, Mich. Dec. 31, '80
Cook, Prof. G. H., New Brunswick, New Jersey.....June 28, '78
Cope, E. D., Philadelphia, Pa..Apr. 27, '77
Coues, Dr. E., Washington, D.C. Apr. 27, '77
Coulter, J. M., Hanover, Ind ...Apr. 27, '77
Cowan, Frank, Greensburg, Pa.Oct. 31, '79
Cox, E. T., Indianapolis, Ind..Apr.. 27, '77
Cox, L. A.,— ——.....Aug. 26, '87
Crampton, C. A., Moline, Ill....Apr. 25, '79
Crapnell, W., New Boston, Ill..Dec. 14, '67
Crawford, H. D., Ottumwa, Ia..Aug. 31, '83
Cresson, E. T., Philadelphia, Pa. July 28, '76
Crooke, J. J., New York City....Apr. 27, '77
Culver, L. M., Waukegan, Wis..Nov. 5, '80
Cummings, Isaac, — ——.....Feb. 22, '68
Dall, W. H., Washington, D.C..Apr. 27, '77
Dalrymple, Rev. E. A., Baltimore, Maryland.....Apr. 27, '77
Dana, Prof. J. D., New Haven, Connecticut.....Apr. 27, '77
Davis, W., Iowa City, Ia.....May 25, '83
De Hart, Dr. J. N., Whippany, New Jersey.....Oct. 31, '79
Demarest, Rev. M., Pena Blanca, New Mexico..... Sept. 24, '97
De Saussure, Henri, Geneva, Switzerland..... Apr. 25, '79
Dial, Joshua, Senatobia, Miss....Jan. 4, '68
Dickey, S. H., Fulton, Ill. ....Dec. 14, 67
Dimmick, Dr. L. N., Santa Barbara, Cal..... Dec. 29, '76
Dodge, C. R., Washington, D.C.Apr. 27, '77
Doerflinger, C., Milwaukee, Wis.Oct. 29, '86
Drake, Dr. S. H., West Union, Ia.Sept. 26, '79
Duges, Eugene, Silao, Guanejuanto, Mexico .....Mch. 28, '79
Eads, A. D., Champaign, Ill.....Jan. 4, '68
Eads, Rev. R. S., Bolton, Mass...Jan. 4, '68
Edwards, Henry, Boston, Mass. July 28, '76
Edwards, W. H., Coalburg, West Virginia..... .....Apr. 27, '77
Eagan, W. C., Chicago, Ill.....Sept. 24, '80
Eliot, Rev. T. L., Portland, Or..Nov. 5, '80
Emerton, J. H., Salem, Mass...Apr. 27, '77
Englemann, Dr. Geo., St. Louis. July 28, '76
Englemann, Dr. G. J., St. Louis. Apr. 27, '77
Espinoza y Cervantes, Antonio, San Luis Potosi, Mex .....Mch. 29, '78
Farlow, Prof. W. G., Boston....Apr. 27, '77
Farnier, Prof. P., Paris, France. Dec. 29, '82
Farnsworth, Dr. P. J., Clinton, Ia. Sept. 24, '86
Faught, V. R., Hamilton, Ill....Dec. 14, '67
Fitch, Dr. Asa, Salem, N. Y. .. July 27, '77
Field, Burr R., Baltimore, Md....
Firor, V. M., Charlestown, W. Va. Nov. 28, '78
Flagler, Gen. D. W., Wash., D.C. Apr. 25, '79
Foreman, Dr. E., Wash'n, D.C..Apr. 27, '77
Forbes, S. A., Normal, Ill.....Apr. 27, '77
Fresenius, Dr. C. R., Wiesbaden, Germany.....Dec. 29, '82
Gardner, Jas. T., Albany, N. Y..Apr. 27, '77
Gentry, T. G., Germantown, Pa. Apr. 27, '77
Gilchrist, Miss Belle M., Des Moines, Ia.....Sept. 24, '86
Gill, Theo. H., Washington, D.C. June 29, '77
Glaspell, Chas., Kansas City, Mo. Sept. 4, '68
Glover, Townsend, Wash'n, D.C. June 29, '77
Goodale, Prof. George L., Cambridge, Mass.....Apr. 27, '77
Goss, B. F., Pewaukee, Wis....Oct. 29, '86
Graham, Mrs. Lizzie Allen, Davenport, Ia..... Feb. 12, '69
Grant, Dr. H. M., Helena, Ark...May 25, '83
Greene, Rev. E. L., Denver, Col. Apr. 27, '77
Greenlee, W. F., Belle Plain, Ia. June 29, '88
Gregory, Prof. J. M., Champaign, Illinois..... July 27, '77
Griffith, Lieut. J. E., U. S. Lake Survey.....Mch. 29, '68
Grote, Prof. A. R., New Brighton, New York..... ....Dec. 31, '80
Gunning, W. D., Boston, Mass. Apr. 27, '77
Gunther, Otto, Worcester, Mass. Jan. 25, '78
Gurney, James, St. Louis, Mo...Oct. 29, '86
Guyot, Prof. A., Princeton, N. J. Apr. 27, '77
Hagen, Dr. Herman A., Cambridge, Mass.....July 28, '76

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*Haines, Mrs. Mary P., Richmond, Indiana ..... May 29, '74
*Hall, Prof. Jas., Albany, N.Y. . Apr. 27, '77
Hall, M. S., Wilmington, Illinois. (transferred)..... Jan. 25, '68
Harford, W. G. W., San Fr., Cal. July 28, '76
Harkness, Dr. H. W., San Francisco, Cal..... Apr. 27, '77
Harris, D. H., Cuba, Ill..... Mch. 26, '86
Hasselquist, Prof. L. R., Rock Island, Ill..... Nov. 30, '83
Hawkins, B. W., Phila., Pa..... Apr. 27, '77
Haworth, Prof. Erasmus, Oskaloosa, Ia..... Dec. 26, '95
Hayden, Dr. F. V., Wash., D. C. Apr. 27, '77
Hennings, E. J., Pewaukee, Wis. Oct. 29, '86
Henderson, L. F., Portland, Or... Nov. 5, '80
Herrera, Alfonso, City of Mex.. Mch. 29, '78
Higday, Dr. T., La Porte, Ind.. Dec. 14, '67
Hilder, F. F., St. Louis, Mo..... Apr. 27, '83
Hinrichs, Prof. Gustavus, Iowa City, Ia. (transferred)..... Jan 25, '68
Hiskey, W. O., Minneap., Minn.. Jan. 4, '68
Hoerring, G. P., Iowa City, Ia... Feb. 25, '87
Hoffman, Dr. W. J., Washington, D. C..... Mch. 28, '79
Holbrook, W. C., Coleta, Ill.... Mar. 28, '79
Holden, Wm., Marietta, O..... Apr. 27, '77
Holmes, W. H., Wash'n, D. C... Oct. 26, '83
Horn, Dr. Geo. H., Phila., Pa... Apr. 27, '77
Hoy, Dr. R. R., Racine, Wis.... Aug. 31, '88
Hyatt, Prof. Alpheus, Boston... Apr. 27, '77
Iles, Malvern W., Denver, Col.. Apr. 27, '77
Ingersoll, Ernest, Jers. City, N.J Apr. 27, '77
Johnson, Dr. H. A., Chicago, Ill.. July 28, '76
Johnson, O. B., Salem, Or..... Nov. 5, '80
Jones, Dr. Jos., New Orleans, La. Apr. 27, '77
Jones, Thos. J., Coal Valley, Ill. Dec. 14, '67
Jones, Capt. Wm. A., Charleston, South Carolina..... Apr. 27, '77
Kellogg, Dr. A., San Fran, Cal.. July 28, '79
Kellogg, Dr. C. F., Charlotte, Ia. Jan. 28, '81
Kenicott, Dr. Robert, Chicago, Ill. (transferred)..... Jan. 25, '68
Kiel, J. B., Montrose, Ia..... Nov. 26, '80
King, Clarence, Wash'n, D. C... Apr. 25, '79
King, Rev. J. D., Edgartown, Mass..... June 27, '79
Kirby, Mrs. Julia D., Jacksonville, Illinois..... Oct. 26, '77
Kock, Dr. L., Nuremberg, Bav. Nov. 28, '78
Landeau, S. L., Paris, France.. Mch. 25, '98
Landry, Dr. S. F., Galvest'n, Ind. May 28, '86
Lapham, Dr. I. A., Milwaukee, Wis. (transferred)..... Feb. 1, '68
Latham, Mrs. R. E., Lincoln, Ill. Sept. 24, '80
Lathrop, D., La Salle, Ill ..... Dec. 14, '67
Lea, Dr. Isaac, Philadelphia, Pa.. Apr. 7, '77
Lee, Milo, Rock Island, Ill..... Jan. 25, '98
Leggitt, W. H., New York City... Apr. 7, '77
Leidy, Jos., Philadelphia, Pa.... Apr. 27, '77
Lemmon, J. G., Sierra Val'y, Cal. Dec. 29, '79
*Lesquereux, Leo, Columbus, O. Apr. 27, '77
Leveritt, Frank, Denmark, Ia... May 28, '86
Lewis, H. W., Davenport, Iowa, (transferred)..... Dec. 29, '82
Lighton, Thos., Rock Island, Ill. Jan. 25, '68
Lindahl, Prof. J., Rock Isl'd, Ill.. Oct. 31, '79
Lingle, David, Rock Island, Ill.. Jan. 25, '68
Lintner, J. A., Albany, N. Y..... Apr. 27, '77
Longpre, L. J., Ontonagon, Mich Oct. 31, '79
MacLean, Rev. J. P., ——..... July 30, '86
Macomber, Prof. J. R., Ames, Ia. June 24, '81
Mahoney, J. A, Ramelton, Ire.. Dec. 20, '82
Mann, B. P., Cambridge, Mass.. Apr. 27, '77
Mark, Dr. E. L., C'mb'ge, Mass. Nov. 28, '78
*Marsh, Prof. O. C., New Haven, Conn..... Apr. 27, '77
Mason, L. G., Oregon, Ill..... May 27, '87
Mason, O. T., Washington, D.C. Apr. 27, '77
*May, Enoch, Burlington, Ia.... Dec. 14, '67
McCarn, Miss C., Anamosa, Ia.. Feb. 23, '83
McCook, Rev. H. C., Phila., Pa.. Apr. 27, '77
McCowen, Miss S., Engle'wd, Ill. Nov. 27, 86
McGee, W J, Farley, Ia..... June 24, '81
McMeehan, Miss E., Camanche, Iowa..... Dec. 29, '82
McNeill, Prof. Jerome, Fayetteville, Ark..... Dec. 27, '95
McWhorter, Tyler, Aledo, Ill... June 24, '81
Mead, Theo. L., New York City. Apr. 27, '77
Meehan, T., Philadelphia, Pa... Apr. 27, '77
Mendoza, Gumesindo, Museo Nacional, Mexico..... Mch. 29, '78
Merriman, Mrs. Dwight, Jackson, Mich..... Jan. 25, '78
Miles, Joshua J., Clinton, Ill..... Jan. 4, '68
*Miller, S. A., Cincinnati, O.... Dec. 28, '77
Milligan, Mrs. J. M., Jacksonville, Illinois..... Dec. 28, '77
Moore, W. B., San Antonio, Tex.. Jan. 4, '68
Morgan, L. H, Rochester, N. Y. Apr. 27, '77
Morris Rev. J.G., Baltimore, Md. Apr. 27, '77
Morse, Edw. S., Salem, Mass... June 29, '77
Mueller, A. L., Sioux City, Ia.... Nov. 28, 84
Muench, Fr., ——, Mo..... Jan. 25, '68
Nadaillac, Marquis de, Paris, Fr. June 26, '85
Newbury, Prof. J. S., N. Y. City.. Jan. 30, '74
Newcomb, Dr. W., Ithaca, N. Y. Apr. 27, '77
*Nipher, Prof. F. E., St. Louis.... July 27, '77
Nissen, Theo., Davenport, Ia..... Jan 4, '68
Norton, E., Farmington, Conn.. June 29, '77
Olmstead, Prof. L. G., Fort Edward, N. Y..... Oct. 26, '77
Olney, S. T., Providence, R. I... Apr. 27, '77
Orcott, Mrs. C. R., San Diego, Cal..... Aug. 25, '82
Orr, Ellis, Postville, Ia..... Oct. 26, '83

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Osborn, Prof. H., Ames, Ia.....Aug. 25, '82
Osten Sacken, Baron C. R., Heidelberg, Germany.....Sept. 28, '76
Packard, Dr. A. S., Jr., Salem, Mass.....Apr. 27, '77
Palmer, Dr. E., Camb'dge, Mass. Dec. 29, '76
Parker, Prof. H. W., Ames, Iowa, (transferred).....May 1, '68
Parker, N. H., St. Louis, Mo ...Mch. 14, '68
Patterson, H. N., Oquawka, Ill..Apr. 25, '79
Paul, Dr. John, Ottawa, Ill.....Mch. 12, '69
Peabody, Prof. S. H., Chicago...July 28, '76
Peckham, G. W., Milwaukee....Jan. 25, '84
Peet, Rev. S. D., Unionville, O..Apr. 27, '77
Perry, Mrs. C. H., Keokuk, Ia...Sept 24, '80
Philippi, Dr. R. A., Santiago, Ch. Nov. 28, '78
Piernas, Dr. J. A., San Luis Potosi, Mexico.....Mch. 29, '78
Pooler, F. S., Albany, Ill.....Oct. 31, '79
Porter, Miss Mary, Pekin, China. Nov. 5, '80
Porter, Thomas C., Easton, Pa..Apr. 27, '77
Powell, Prof. J. W., Urbana, Ill. Mch. 21, '68
Poynter, Robert, Poynter, Ark. Sept. 26, '84
Proudfit, S. V., Glenwood, Ia....Apr. 29, '81
Putnam, F. W., Cambr'ge, Mass..July 28, '76
Rathvon, Dr. S. S, Lancaster, Pa. Oct. 31, '79
Rau, Dr. Chas., Wash'n, D. C....Apr. 27, '77
Redfield, J.H., Philadelphia, Pa. Apr. 27, '77
Reilly, Albert, Davenport, Ia...Apr. 27, '77
Reppert, Fred., Muscatine, Ia..Apr. 27, '77
Ridgway, Robert, Wash'n, D. C. Apr. 27, '77
*Riley, Chas. V., Wash'n, D. C..Dec. 14, '67
*Rodman, Gen. T. J., Rock Island Arsenal.....Dec. 14, '67
Roe, Dr. E. R., Bloomington, Ill. Dec. 14, '67
Sanchez, Jesus, Museo Nacional, Mexico.....Mch. 29, '78
Sanders, Mrs. M. A., Davenport, Iowa (transferred).....Jan. 4, '68
Saunders, Wm., London, Ont...Apr. 27, '77
Schmidt, Dr. Emil, Essen, Prus. Jan. 31, '79
Scudder, S. H., Cambr'ge, Mass. Apr. 27, '77
Sedbury, Dr. W. R., Detroit, Mich. Apr. 25, '90
Seve, Edw., N. Y. City (trans'd)...Jan. 4, '68
Seyffarth, Dr. G., N. Y. City.....Apr. 25, '79
Shaler, Prof. N. S., Cambridge, Mass.....Apr. 27, '77
Shaw, James, Mt. Carroll, Ill....June 25, '80
Shepard, C. U., Amherst, Mass. Mch. 26, '80
Shepard, C. U., Jr., Charleston, South Carolina.....Mch., 26, '80
Shimek, Prof. B., Iowa City, Ia..Apr. 26, '89
Shimer, Dr. H., Mt. Carroll, Ill...June 25, '80
Shipp, Dr., Shipp's Land'g, Tenn. Jan. 29, '80
Shroyer, J. E., Cincinnati, O....Apr. 27, '77
Signoret, Dr. V., Paris, France..Nov. 28, '78
Silorato, Pietro Bernabo, Rome, Italy.....Nov. 28, '86
Simon, Eugene, Paris, France..May 30, '70
Simpson, C. T., Ogalalla, Neb...July 30, '86
Smith, Miss Emily A., Peoria, Ill. July 27, '77
Smith, Miss Rose, San Diego, Cal. Oct. 26, '83
Smith, S. I., New Haven, Conn..Apr. 27, '77
Snow, Prof. F. H., Lawrence, Kan. Apr. 27, '77
Somers, W. D., Urbana, Ill.....Jan. 4, '68
Starr, Prof. F., Cedar Rapids, Ia. Aug. 27, '86
Stearns, R. E. C., Berkely, Cal..Apr. 27, '77
Steiniger, Oscar, Bellevue, Ia...Aug. 31, 77
Stennett, Dr. W. H., Bloomington, Illinois.....Aug. 7, '68
Sterling, Dr. E., Cleveland, O...June 29, '77
Stewart, J. R., Toledo, Ia.....Jan. 25, '68
Stillman, Dr. J. D. B., San Francisco, Cal.....Dec. 29, '76
Strecker, Herman, Reading, Pa. July 28, '76
Stretch, R. H., San Fran., Cal...July 28, '76
Suksdorf, H. F., Portland, Or....Nov. 5, '80
Suksdorf, William, White Salmon, W. T.....Nov. 5, '80
Summers, W. D., Urbana, Ill.....Jan. 4, '68
Swiney, Dan'l, Ramelton, Irel'd. Dec. 31, '80
Tandy, M., Dallas City, Ill.....Dec. 28, '77
Tanner, Frank B., Dubuque, Ia...Jan. 4, '68
*Tenney, Prof. Sanborn, Williamstown, Mass.....Apr. 27, '77
Thomas, Dr. C., Carbondale, Ill. July 28, '76
Thomas, Prof., Portland, Or.....Nov. 5, '80
Thomson, Rev. H. C., Monterey, Mexico.....Feb. 28, '79
Thorell, Prof. T., Upsala, Swd'n. Nov. 28, '78
Thurber, Geo., New York City..Apr. 27, '77
Toellner, A., Milwaukee, Wis..Mch. 26, '80
Tolmie, Dr. W. F., Victoria, B. C. Nov. 5, '80
Torrel, Prof. O., Stockholm, Sw. July 27, '77
*Torrey, Dr. Jno., N. Y. City ....Mch. 12, '69
Tracy, Prof. S. M., Columbia, Mo. Aug. 27, '86
Treat, Mrs. Mary, Vineland, N. J. June 29, '77
Trimen, Prof. Roland, Cape Town, Africa.....Mch. 28, '79
*Tryon, G. W., Philadelphia, Pa. Apr. 27, '77
Udden, Prof. J. A., Rock Isl., Ill. Jan. 25, '89
Uhler, Philip R., Baltimore, Md. Apr. 27, '77
Ulke, Henry, Wash'n, D. C.....July 28, '76
Vasey, Dr. Geo., Wash'n, D. C..Apr. 27, '77
Velie, Dr. J. W., Chicago, Ill....July 28, '76
Verrill, A. E., New Haven, Conn. Apr. 27, '77
Villada, Manuel M.,——, Mex..Mch, 29, '78
Vining, E. P., Omaha, Neb.....May 25, '83
*Wachsmuth, Prof. Charles, Burlington, Iowa.....Mch. 28, '79
Waldron, Dr. C. F., Brush Creek, Iowa.....Dec. 28, '78
Waller, B. F., New Palestine, Mo. Sept. 24, 86
*Walsh, Benj. D., Rock Isl'd, Ill. Dec. 14, '67
Walton, Miss Alice B., Muscatine, Iowa.....Jan. 25, '78
Ward, Prof. H. A., Rochester, New York.....Dec. 28, '78

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Watson, Sereno, Camb'ge, Mass. Apr. 27, '77
Watson, Warren, Kan. City, Mo. Apr. 25, '90
Wellington, W. E., Dubuque, Ia. Jan. 25, '68
Wheeler, Lieut. G. H., Washington, D. C. Apr. 25, '79
White, A. D., Ithaca, N. Y. June 29, 77
White, Dr. C. A., Iowa City, Ia. Dec. 14, '67
Whitfield, R. P., Albany, N. Y. Apr. 27, '77
Whitney, Prof. J. D., Cambridge, Mass. Apr. 27, '77
Whitney, Prof. W. D., Baltimore, Md. Apr. 27, '78
Whittlesey, Col. Charles, Cleveland, O. Apr. 27, '77
Wickham, Prof. H. F., Iowa City, Iowa. Dec. 27, 95
Wilcox, Dr. H. B., Three Oaks, Mich. (transferred) May 1, '68
Wilder, Prof. B. G., Ithaca, N. Y. Apr. 27, '77
Wilson, Judge W. W., Lebanon, O. Oc. 27, '82
Winchell, Prof. Alexander, Syracuse, N. Y. June 29, '77
Winchell, Prof. N. H., Minneapolis, Minn. Apr. 25, '79
Winslow, Dr. —, Peru, Ill.
Wirt, Miss Julia J., Payson, Utah. Nov. 23, '76
Wislizenus, Dr. A., St. Louis, Mo. Mch. 12, '69
Witter, Prof. F. M., Muscatine, Iowa. Apr. 30, '86
Wolf, John, Canton, Ill. July 28, '76
Woodman, H. T., Dubuque, Ia. Apr. 27, '77
Woodruff, Prof. L. D, San Diego, Cal. Nov. 30, '83
Worthen, Prof. A. H., Springfield, Ill. Dec. 14. '67
Wright, W. G., San Bernardino, Cal. Dec. 29, '76
Young, H. C., Glasgow, Scotl'd. Oct. 31, '79
Young, Rev. Thomas L., ——. Aug. 26, '87

REGULAR MEMBERS.

RESIDENCE, DAVENPORT, UNLESS OTHERWISE STATED.

*Deceased.

Abel, H., Jr. Dec. 31, 1886
Adams, Capt. A. E.
Adams, Claude E. May 29, 1896
*Adams, Walker. Aug. 31, 1877
Adams, Mrs. Walker. July 28, 1876
Albrecht, Otto.
Allen, Joseph. Feb. 25, 1877
*Allen, Col. William. Oct. 31, 1873
*Allen, Mrs. Col. William. July 30, 1875
Allen, Dr. W. L. June 29, 1877
Anderson, Rev. S. MacA. Oct. 9, 1868
Andresen, H. H. Jan. 28, 1881
Andresen, Richard. Mch. 31, 1899
Andrews, Major —. Apr. 25, 1873
Ansley, Clark F., Swedona, Ill. Aug. 25, 1882
Atkinson, B. Nov. 13, 1868
Babcock, D. D. Dec. 11, 1868
Babcock, E. J. May 5, 1876
*Bahls, John. Sept. 2, 1877
Baker, Dr. C. R. Sept. 11, 1895
Baker, Mrs. Fred. Oct. 29, 1875
Baker, George T. Apr. 28, 1893
Baker, Dr. J. W. H. May 25, 1883
*Baker, Dr. R. F. Jan. 11, 1869
Balch, F. A. May 28, 1875
Ballard, John W. June 29, 1883
Ballord, Miss Bessie. Mch. 31, 1899
Ballord, E. S. Feb. 26, 1875
*Ballou, George H. July 30, 1875
Ballou, Mrs. Geo. H. July 30, 1875
Bardwell, Dr. Eugene O. Jan. 25, 1884
Barker, George J. May 25, 1883
*Barler, A. U. Founder
Barrette, Miss Lydia O. July 30, 1875
Barris, Prof. W. H. Dec. 14, 1867
Bean, J. L. Jan. 18, 1868
Bechtel, George M. May 31, 1898
Becker, Gustav. June 29, 1883
Behr, Dr. A. Feb. 23, 1894
Beiderbecke, Charles. Dec. 28, 1877
Bemis, Fred P. Apr. 26, 1895
Benson, H. H. Feb. 28, 1873
*Berryhill, J. H. Oct. 30, 1874
Berwald, John. July 27, 1877
Best, L. P. Feb. —, 1893
*Bills, Hon. J. C., Apr. 30, 1875, Jan. 8, 1892
Bills, Mrs. John C. Dec. 31, 1875
Bissell, W. P. May 25, 1883
Blackmon, P. S. Mch. 30, 1877
Block, Louis. Feb. 27, 1891
Blumer, Rev. A. June 25, 1880
Bollinger, J. W. Feb. 25, 1887
Bollinger, A. L. Jan. 25, 1884
Borcherdt, Edward. Feb. 23, 1894
Bowman, Dr. A. W. Dec. 31, 1886
Bowman, J. R. Oct. 30, 1874
Boynton, E. W. Dec. 27, 1895
Brewster, W. C. Apr. 25, 1873
Brewster, Mrs. W. C. Dec. 17, 1877
Bronson, C. E. Jan. 28, 1876
*Brownson, William H. Sept. 27, 1889
Brown, C. J. Feb. 27, 1880
Brown, L. B. June 25, 1875
Brown, Manily T. Nov. 26, 1875
Brown, Mrs. Mary E. Apr. 25, 1879
*Brown, S. E. June 25, 1875

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Bryant, Seth P.....Oct. 9, 1868
Bryant, Mrs. Seth P.....
Buffum, Rennah.....Oct. 30, 1874
Bunker, Andrew .....Feb. 25, 1870
Bunker, M.....Oct. 24, 1895
*Burchill, Robert .....June 29, 1883
Burdick, A ..... Oct. 26, 1877
Burdick, Mrs. A.....Oct. 26, 1877
Burr, Charles P.....May 30, 1873
Bushnell, H. T.....Feb. 28, 1879
Cable, George W.....Oct. 31, 1884
Cable, George W., Jr.....Mar. 31, 1899
Calderwood, M. H., Eldridge, Iowa.....July 30, 1886
Call, Prof. R. E., Moline, Ill. Nov. 27, 1885
Campbell, W. P.....Feb. 8, 1868
Candee, F. A., Moline, Ill..Jan. 31, 1879
Carl, E. S.....Oct. 31, 1884
Carleton, Frank.....June 29, 1883
Carmichael, Henry.....Oct. 31, 1879
Carmichael, Joseph E ..March 31, 1876
Carstens, Gustav.....May 26, 1876
Cassell Dr. M. H.....June 29, 1883
Cassell, Mrs. M. H... .....June 29, 1883
Challen, Rev. James .....Dec. 11, 1868
Chapin, Miss — .....Oct. 28, 1868
Chapin, E. C.....Feb. 25, 1876
Chapin, Mrs. E. C.....Feb. 25, 1876
*Churchill, Dr. A. D .....
Clarke, E.A., April 27, 1877, June 29, 1883
*Claussen, H. R .....Jan. 25, 1878
Claussen, William.....May 25, 1883
Clemmer, C. H.....April 30, 1875
Clevenger, J. J.....June 29, 1883
*Cochran, Dr. M. B ....March 12, 1869
Cochran, Mrs. M. B.....June 25, 1875
Collins, Miles A.....Feb. 8, 1868
Conner, Mrs. H. M.....Nov. 5, 1880
Conner, J. S .....Oct. 9, 1868
*Cook, Mrs. Clarissa C....Jan. 28, 1876
Cook, E. E .....May 25, 1883
*Cook, Judge William....June 30, 1876
Copeland, George E .....Aug. 27, 1886
*Crandall, J. A.....Feb. 25, 1875
Crawford, John N .....Oct. 2, 1868
*Crawford, Joseph A .....May 29, 1874
Crawford, Mrs. Joseph A..July 30, 1875
Crawford, Dr. J. P., May 25, '83, Dec. 27, '95
Crosby, Prof. W. E .....Jan. 27, 1871
Crossett, Edward Clarke. March 31, 1899
Crossett, E. S. .....
Crossett, Mrs. E. S.....
*Curry, Mrs. T. F. M.....May 5, 1876
Cutter, A. F .....May 25, 1883
Dahm, C. T.....June 25, 1880
*Dahms, John J .....May 28, 1886
Dalzell, Henry .....July 30, 1875
Daniel, Dr. Joseph A.....April 26, 1895
Darlington, Howard .....Oct. 9, 1868
Dart, Henry, R. Isl'd, Ill ..Oct. 28, 1881
Davies, J. Meredith .....Aug. 31, 1877
*Davies, John L .....Jan. 25, 1868
Davies, Mrs. John L.....Aug. 27, 1875
Davies, L. S .....Feb. 28, 1874
Davies, Mrs. L. S .....Sept. 2, 1877
Davis, F. O., Dec. 28, 1877, Aug. 25, 1882
Davison, Charles.....Aug. 31, 1877
Davison, Miss Ella .....Aug. 31, 1877
Dawson, Miss Rose ... .April 27, 1877
Day, E. A .....Feb. 28, 1868
Daymude, J. L .....
*DeArmond, J. M .....March, 28, 1873
Decker, Hal .....Oct. 29, 1886
Dennis, Dr. A. B.....Aug. 27, 1886
*Dermody, J. L.....Jan. 25, 1868
Doe, Gilman .....Feb. 27, 1880
Donahue, James .....
*Donahue, Michael..... Feb. 29, 1868
Donaldson, Dr. John B....June 25, 1898
*Dosh, J. P .....June 25, 1875
Dow, Geo. S. C.....March 21, 1868
*Dow, T. T.....Nov. 30, 1877
Durfee, C. S ....May 25, 1883
Eads, Luther T .....Founder
*Edwards, Frank.....March 3, 1882
Egbert, Col. Henry.....May 25, 1883
*Eldridge, C. H .....April 3, 1868
*Ells, C. S.....Dec. 14, 1867
Elmer, Dr. A. W.....Feb. 27, 1891
Emeis, H. A.....June 29, 1883
Evans, John . .....Feb. 12, 1869
Evans, Joseph .....Dec. 31, 1886
Falk, Theo .....June 29, 1883
*Farquharson, Dr. R. J...Dec. 11, 1868
*Fejervary, Mrs. Karoline. Sept. 28, 1877
Ficke C. A.....Jan. 25, 1878
Ficke, Mrs. C. A.....Feb. 29, 1896
Fidlar, Frank .....Jan. 29, 1897
Fidlar, W. F.....May 25, 1883
Fisher, J. B .....May 28, 1875
Fisher, Mrs. M .....Jan. 28, 1876
Fisher S. A..... .....
Fitch, G. W .....Nov. 26, 1875
Fitch, Mrs. G. W.....March 31, 1876
Flemming, J. R.....May 25, 1883
Fletcher, D. A .....April 27, 1877
Fluke, W. H .....May 25, 1883
*Frahm, Henry.....April 25, 1878
Francis, Charles .....May 29, 1896
Freeman, J. A.....Nov. 26, 1875
French, C. A.....
*French, George H.....Aug. 7, 1868
French, Mrs. Geo. H.....July 30, 1875
French, Geo. W. July 30, '75, Mar. 30, '83
French, Mrs. Geo. W., (Miss Clara Decker).....May 25, 188
French, Dr. L.....Dec. 11, 1868
French, Nathaniel.....May 25, 1883

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*French, Robert T.....Oct. 31, 1884
Fulton, Harry C.....Dec. 31, 1875
Gannon, M. V.....March 30, 1877
Garrett, D. C.....June 29, 1883
Garstang, Frank W.....Feb. 26, 1897
Gartside, B. W.....Dec. 28, 1877
Gass, Rev. J.....May 28, 1875
Geisler, Emil.Oct. 31, 1879, Feb. 29, 1896
*George, John.....Oct. 27, 1882
*Gifford, Ira M.....Feb. 29, 1868
Gifford, Mrs. Ira M.....July 30, 1875
Gilman, S. F.....Jan. 29, 1875
Glass, C. D.....Jan. 29, 1875
*Glime, Benjamin.....March 31, 1882
Goldsbury, Jay.....Oct. 27, 1876
Goos, William.....Aug. 31, 1883
Gould, Miss Ellen.....1888
Grant, Gough B.....May 26, 1883
Grant, Mrs. James.....
Grant, Dr. W. W.....May 25, 1883
Gray, William.....Oct. 9, 1868
Green, Wesley.....Jan., 1892
Grier, John N.....Feb. 25, 1887
Griggs, F. H.....July 30, 1875
Gronen, W. O.....Dec. 28, 1877
*Gronen, Mrs. Sophia C...Nov. 5, 1880
Gudeman, Dr. Edward...Sept. 27, 1895
Gwynn, Oscar J.....Nov. 29, 1889
Haddix, E. P.....Jan. 11, 1869
Haddix, Miss Florance...Dec. 31, 1886
Haddix, Miss Grace.....Dec. 31, 1886
Hall, Miss Grace.....June 25, 1880
*Hall, Israel.....Nov. 23, 1876
Hall, William C.....Jan. 11, 1869
Hall, Capt. W. P.....May 28, 1875
Hall, Mrs. W. P.....June 25, 1880
Hammatt, Edward S.....April 29, 1892
Hancock, F. H.....May 28, 1875
Hanssen, Louis.....Dec. 31, 1880
Harrison, Charles E.....Oct. 29, 1875
Harrison, Mrs. C. E.....March 2, 1888
Harrison, J. H.Feb. 23, 1877, May 25, 1883
Hartley, James.....Aug. 31, 1883
Hass, Detlef.....Aug. —, 1887
Hass, J. H.....Feb. 25, 1898
*Hastings, Frank S.....
Hatch, Prof. W. H., Rock Island, Illinois.....Dec. 28, 1883
Hathaway A. D.....May 25, 1883
Haupt, J. G.....Nov. 27, 1874
Haverstick, Capt. L. M...Nov. 28, 1873
Hazen, Dr. E. H.....Oct. 2, 1868
Hazen, Mrs. E. H.....June 25, 1875
Heinz, Fred.....Dec. 31, 1886
Hender, W.....May 25, 1883
Hender, William H.....Dec. 27, 1895
Henderson, H. H.....Oct. 28, 1869
Henley, H. M.....Aug. 31, 1883
Heywood, George S.....Jan. 30, 1874
Hill, Charles.....
Hill, John.....May 25, 1883
*Hill, R. B.....Dec. 30, 1870
Hinrichs, G. H.....Jan. 26, 1883
Hœpfner, Dr. G.....July 30, 1886
Holmes, Miss Clara M.....—,—, 1875
*Holmes, Wm. H.....Feb. 8, 1868
Hoover, Rev. Geo. K.....Jan. 30, 1891
Hopkins, E. P.....Jan. 28, 1876
*Howard, Mrs. Nettie F...Jan. 28, 1897
Howe, T. H., Pittsburgh, Pa. Mch. 30, '77
Hoyt, John.....June 29, 1883
Hubbell, Charles H.....Oct. 28, 1881
Huebinger, Adam.....Dec. 31, 1886
Huebinger, Melchior.....Dec. 31, 1886
Hume, John.....Jan. 4, 1868
*Hume, Mrs. John.....Jan. 25, 1875
Humphrey, Levi.....Nov. 26, 1875
Humphrey, Mrs. J. J.....April 27, 1877
*Hunting, Rev. S. S.....May 29, 2874
Hunting, Mrs. S. S.....June 25, 1875
Huntington, Mrs. H. B....Aug. 27, 1875
*Iles, Dr. T. J.....Jan. 18, 1868
Iles, Thomas, Jr.....Mar. 31, 1899
Jaenicke, Dr. A.....July 30, 1886
Jappe, Thos. H.....Aug. 27, 1886
Jenckes, Rev. Joseph S....Jan. 26, 1877
Jenkins, Mrs. G. W.....June 25, 1880
*Jervis, Frank I.....Feb. 25, 1876
Jervis, Mrs. F. I.....Feb. 25, 1876
Jones, P. B.....Oct. 2, 1868
Judy, Rev. A. M.....Nov. 24, 1882
Karwarth, Henry.....May 25, 1883
Kelley, F. W.....Jan. 29, 1875
Kerker, George W.....
Kinsey, J. C.....Jan. 28, 1881
Kirk, Franklin, Sr.....Oct. 30, 1874
*Klug, Otto.....Mar. 29, 1878
Knapp, M. M.....June 28, 1884
Koch, Gustav.....Aug. 31, 1883
Krabbenhœft, Geo.....Dec. 31, 1886
Krabbenhœft, Theo.....Dec. 31, 1886
Kracke, Frank.....June 29, 1883
*Kramer, Geo. F.....May 25, 1883
Krause, Robert.....Jan. 25, 1878
Kruse, Conrad..Dec. 28, '77, Nov. 5, '80
*Kuhnen, Nicholas.....Nov. 5, 1880
Kuhnen, N. V.....Dec. 31, 1880
*Kulp, Dr. W. O.....June 29, 1883
Kurmeier, H.....Nov. 5, 1880
*Lambach, Henry.....Jan. 25, 1878
*Lane, James T.....Mch. 20, 1875
Lane, Mrs. James T.....June 25, 1875
Lardner, James F.....Dec. 27, 1895
Launsbury, Rev. A.....Apr. 28, 1871
Le Claire, Antoine J.....June 28, 1878
Le Claire, Joseph A.....July 30, 1875
Leonard, Miss Nellie...March 31, 1899
*Leonard, C. M.....June 29, 1883

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Lerch, A. J. ..... June 29, 1883
*Lerchen, Herman ..... Dec. 31, 1880
*Lesslie, Charles C. ..... Jan. 29, 1875
Lewis, H. W. ..... Nov. 5, 1880
Lighton, Thos., Rock Island, Illinois ..... July 30, 1869
Lillibridge, D. R ..... Jan. 7, 1880
Lillis, W. M., Aug. 27, '86, Jan. 28, 1898
Lindley, Dr. Clarence T. .. May 28, 1875
Lindsay, J. E. ..... June 25, 1886
Lindsay, Mrs. J. E. ..... June 25, 1886
Lischer, Henry .....
Lorenzen, Jens ..... Jan. 25, 1878
Lowrey, Miss Alla P. ..... June 28, 1878
Ludlow, E ..... May 25, 1883
*Lumsden, J. A ..... June 29, 1883
Lynch, E. P. ..... Dec. 11, 1868
Lynch, W. A ..... May 29, 1874
*Mandeville, Col. H. M. .. Aug. 31, 1877
Mandeville, Mrs. H. M. .... May 2, 1877
Mansel, Richard, Rock Island, Illinois ..... May 24, 1872
Marix, Max ..... April 25, 1873
Marks, Mrs. M L ..... Mar. 26, 1886
Marsh, Mrs. H. C. ..... May 5, 1876
*Martin, Mrs H. M. ..... Oct. 25, 1875
Martin, A. Vere ..... Feb. 26, 1897
Mason, James B. ..... Feb. 26, 1875
Mason, John L. ..... May 25, 1883
Mast, C. A., June 29, 1883, Oct. 24, 1895
Matthey, Dr. Carl ..... Jan. 18, 1899
Matthey, Dr. H. ..... July 30, 1886
Maxwell, Dr. J. P. ..... Nov. 30, 1883
McBride, Prof. T. H., Iowa City, Iowa ..... Dec., 1895
*McClelland, George P. 1877
McClelland, Mrs. Geo. P. . Apr. 27, 1877
McClelland, Thos. W. ..... Aug. 31, 1877
McClelland, Mrs. T. W. .. Aug. 31, 1877
McClelland, Wilson ..... June 28, 1895
McCosh, J. K. .....
McCowen, Dr. Jennie .... March 3, 1882
McCrum, Miss A. J. S. ..... Dec. 28, 1883
McCullough, W. ..... June 28, 1883
McGonegal, Mrs. M. A. .. Nov. 26, 1875
*McIntosh, Robert ..... Aug. 31, 1877
McNeill, Prof. Jerome, Moline, Illinois ..... Nov. 27, 1886
McWhorter, T., Aledo, Ill. . Jan. 26, 1883
Melville, J. H. ..... Oct. 9, 1868
Merrill, J. E. ..... June 29, 1883
Merriman, Miss Nellie, Jackson, Michigan ..... May 28, 1880
Middleton, Dr. W. D. ..... Feb. 28, 1874
Middleton, Miss Mary. .... Oct. 20, 1875
Miles, Andrew J. .....
Millar, Rolfe S. ..... April 30, 1875
Millar, Mrs. S. B. R. ..... June 25, 1875
Miller, Alonza A. ..... April 30, 1868
Miller, Rev. Emory. ..... June 26, 1872
Miller, F. H. ..... Dec. 28, 1877
Milsted, Thos. G ..... June 29, 1877
*Miner, Dr. A. W. ..... June 29, 1883
*Miner, Mrs. Jennie True . Oct. 17, 1877
Miner, Noyes B. ..... Jan. 7, 1880
Morgan, Dr. J. B ..... May 25, 1883
Morton, Allibone. ..... Mch. 26, 1875
Mossman, A. L ..... Dec. 31, 1886
Mueller, Chris. ..... Dec. 28, 1877
*Murphy, J. H ..... Oct. 31, 1884
Murray, Thomas ..... June 29, 1883
Myers, Miss Lizzie ..... Feb. 27, 1880
*Myers, Dr. R. D. ..... Feb. 1, 1868
Nadler, Frank ..... Mch. 30, 1888
Nagel, J. J. ..... Oct. 30, 1874
Newcomb, C. N ..... Jan. 31, 1896
*Newcomb, Mrs. Patience V. Oct. 29, '75
Nichol, Dr. Adella R ..... Feb. 22, 1895
*Ochs, Francis . ..... Jan. 25, 1878
Oestlund, O. W. ..... Jan. 25, 1884
*Oliver, E. A. ..... Apr. 25, 1879
*Oliver, L. B. ..... Apr. 25, 1879
*Olshaussen, Dr. J. J. ..... Jan. 25, 1878
Osborn, Robert P ..... July 31, 1896
Paine, L. B. ..... Dec. 21, 1868
*Parker, George H ..... Feb. 25, 1876
Parker, George W. ..... Sept. 28, 1876
*Parker, J. Monroe ..... Feb. 26, 1875
*Parker, Mrs. J. M ..... Jan. 25, 1878
*Parks, M. K. ..... May 25, 1883
*Parry, Dr. C. C ..... Dec. 14, 1867
Parry, Mrs. C. C ..... June 25, 1875
Parry, John E., Sandy Hill, New York. ..... May 30, 1879
Parry, Joseph, Jr ..... Dec. 28, 1877
Parvin, Prof. T. S., Cedar Rapids, Iowa. ..... Mch. 30, 1877
Paul, Dr. W. A., Rock Island, Illinois. ..... Dec. 28, 1883
Paulsen, P. J. .....
Peck, Mrs. W. F. ..... Feb. 29, 1896
*Pendleton, E. H., Cin'ti, O. July 27, 1887
Pendleton, Mrs. E. H., Cincinnati, O. ..... July 27, 1887
*Perry, Rt. Rev. Wm. S. .... Dec. 27, 1895
Pester, E. ..... Mch. 26, 1880
Petersen, J. H. C. ..... Jan. 27, 1882
Petersen, L. W., Jr. ..... Oct. 7, 1887
Phelps, J. B. ..... Mch. 26, 1875
Phelps, Mrs. J. B. ..... Dec. 31, 1875
*Pickering, C. E ..... Oct. 26, 1877
Pierce, E. H ..... Mch. 26, 1880
Pierce, J. S. ..... Apr. 27, 1877
Pilsbry, H. A. ..... Oct. 26, 1883
Plummer, Clarence. ..... Nov. 30, 1883
Plummer, C. G ..... Feb. 1, 1868
Pomeroy, F. E. ..... Feb. 25, 1887
*Potter, W. M ..... Mch. 27, '74

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Potter, Mrs. W. M.....July 30, 1875
Powers, C. J.....April 30, 1875
Pratt, Chester L.....Jan. 28, 1876
Pratt, Miss Frankie.....Jan. 28, 1876
Pratt, Miss Lucy.....June 25, 1875
*Pratt, W. H.....Founder
Pratt, Mrs. W. H.....Oct. 31, 1879
Preston, Dr. C. H.....Oct. 31, 1873
*Preston, W. C.....Feb. 25, 1887
Price, Hiram.....Mch. 31, 1899
Price, Reuben S.....Mch. 29, 1878
Price, W. H.....July 26, 1872
Priester, Charles.....June 29, 1883
Putnam, Benj. R.....Aug. 28, 1896
*Putnam, Charles E.....July 30, 1869
Putnam, Mrs. C. E. (Mary L. D.).....June 2, 1869
Putnam, Charles M.....Jan. 26, 1877
Putnam, Edward K.....Nov. 24, 1882
Putnam, Miss Elizabeth D. Oct. 29, 1875
Putnam, George R.....Dec. —, 1877
Putnam, H. St. Claire.....Nov. 26, 1875
*Putnam, John C.....Nov. 26, 1875
*Putnam, Joseph Duncan..June 2, 1869
Putnam, W. Clement.....May 5, 1876
Radenhausen, Dr. P.....Oct. 27, 1882
Raff, Miss Mary.....Oct. 29, 1875
Reed, Weller.....Mar. 30, 1877
Reese, B. F.....Apr. 27, 1877
*Renwick, James.....Feb. 29, 1868
Renwick, Miss Margaret..Jan. 28, 1898
Renwick, Miss Rebecca...Jan. 28, 1898
*Renwick, William.....Mch. 4, 1868
*Renwick, Mrs. William..July 30, 1875
Renwick, Mrs. Ellen Godwin. Jan. 28, '81
Renwick, Wm. Godwin...Mch. 31, 1899
Reupke, C.....June 29, 1883
Rice, Miss Emma Adelia (Mrs. J. J. Richardson).....Sept. 11, 1895
Richards, Clark.....May 25, 1883
*Richardson, D. N.....Feb. 25, 1876
Richardson, Mrs. D. N....Feb. 25, 1876
Richardson, J. J.....June 29, 1883
Richardson, M. N.....June 28, 1895
*Riepe, William.....Dec. 14, 1867
Roberts, Edward C.....Sept. 11, 1895
Roberts, R. W.....Apr. 25, 1873
*Roberts, U. N.....Oct. 31, 1873
Roberts, Mrs. U. N.....Feb. 28, 1879
Robinson, J. Frank, Rock Island, Illinois.....Mch. 31, 1899
Robinson, Capt. T. J.....Mch. 29, 1878
Roddewig, Paulo.....Dec. 27, 1895
Rogers, Miss Harriet.....July 30, 1875
Rohlfs, M. J.....Mch. 31, 1876
Rose, Roderick.....
Ross, W. F.....Mch. 12, 1869
Rothschild, Isaac.....July 27, 1877
*Roundy, Dr. D. C.....Mch. 21, 1868
Rowe, John.....Oct. 29, 1875
*Royce, H. F.....Dec. 26, 1885
Runge, Henry.....Aug. 27, 1875
*Russell, Edward.....Oct. 9, 1868
Russell, Mrs. Edward.....Feb. 25, 1876
Ryan, E. H.....May 25, 1883
Sanders, E. B.....Nov. 27, 1886
Sanders, Miss Julia.....Nov. 5, 1880
Sanders, Mrs. M. A.....Oct. 29, 1875
Sandham, John.....
*Sands, M.....Nov. 27, 1874
Sanger, S. J.....Mch. 12, 1869
*Saunders, Dr. T. J.....Dec. 11, 1868
Scharfenberg, H. G.....May 28, 1886
Schlegel, Dr. E.....Dec. 31, 1880
Schmidt, Charles.....Mch. 30, 1877
Schmidt, F. T.....Oct. 31, 1879
Schmidt, W. O., Feb. 29, '68, June 28, '78
Schroeder, Henry.....
Schumacher, Leo.....May 25, 1877
Seymour, J. S.....Aug. 7, 1868
Sharon, T. L.....Dec. 31, 1886
*Shand, Mrs. W. G.....Nov. 26, 1880
Sheaff, Mrs. Isabella.....Apr. 27, 1877
*Sheldon, Prof. D. S.....Dec. 14, 1867
*Sheldon, Mrs. D. S.....June 25, 1875
Sheriff, Charles E.....May 31, 1895
Sheldon, Miss Sarah Foote. Aug. 25, 1882
Sherman, Mrs. W. B.....Feb. 25, 1876
Sickels, Robert.....—— —, 1875
Sickels, Mrs. Robert.....Oct. 29, 1875
Seiffert, H. O.....
Sieg, Miss Alice.....Dec. 26, 1884
Skinner, W. J.....Nov. 26, 1875
*Skinner, Mrs. W. J.....Nov. 26, 1875
*Smetham, Richard.....Feb. 25, 1876
*Smith, A. J.....Jan. 28, 1897
Smith, E. H.....June 29, 1877
Smith, Henry F.....Dec. 26, 1879
Smith, H. H.....Jan. 28, 1881
Smith, Herman.....Aug. 27, 1886
Smith, S. F.....Aug. 31, 1877
Smith, Mrs. S. F.....Aug. 31, 1877
Smith, W. C.....May 25, 1883
Smith, W. R.....Aug. 25, 1876
Smith, W. S.....Apr. 29, 1881
Snider, W. H., June 29, '83, Jan. 25, 1889
Southwell, J. H., Port Byron, Illinois.....Oct. 27, 1876
Spelletich, M.....Sept. 27, 1895
Spink, George H.....June 25, 1375
*Spink, Henry.....Dec. 25, 1874
Stanton, E. A.....Aug. 27, 1886
Steffen, Herman.....Dec. 31, 1886
*Stephenson, John.....June 29, 1883
Stephenson, W. J.....Feb. 22, 1868
Stevens, W. C.....Aug. 27, 1886
*Stewart, Mrs. J. W.....Feb. 28, 1879
*Stibolt, J. P.....Feb. 25, 1876

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Stibolt, Mrs. J. P.....Feb. 25, 1876
Stoltzenau, H., Muscatine, Iowa.....Oct. 28, '81
Stricker, William.....Dec. 31, 1886
Stuyvesant, M. L.....Nov. 26, 1875
Stuyvesant, Mrs. M. L....Nov. 26, 1875
Suksdorf, Carl F.....May 27, 1887
Sudlow, Miss P. W.....Oct. 29, 1875
Swiney, Thomas O.....May 25, 1883
Switz, John L.....Jan. 28, 1870
Tabor, Ira R.....Oct. 24, 1895
Taylor, Frank W.....May 30, 1879
Techentin, H. W.....Feb. 25, 1887
Teese, J. S.....Feb. 12, 1869
Temple, John.....Feb. 28, 1873
Thackeray, Dr. W. W.....Oct. 26, 1883
Thomas, B. F., Morn'g Sun, Ia. May 27, '87
Thompson, Miss Isabella. May 25, 1883
*Thompson, James.....Mch. 4, 1868
Thompson, James, Jr.....Nov. 26, 1875
*Thompson, Hon. J. W...May 25, 1883
Thompson, Thomas.....Nov. 26, 1875
Thompson, William.....May 25, 1873
Tiffany, A. S.....Founder
Tillinghast, B. F.....May 25, 1883
Tilton, J. C.....Apr. 27, 1883
*Tomson, Mrs. J. J.....May 25, 1883
Tourtelotte, Henry.....June 2, 1869
Tredick, A.....Jan. 8, 1896
Truax, C. H., Maquoketa, Ia. Apr. 27, '77
*True, D S.....Dec. 14, 1867
*True, Mrs. D. S.....Sept. 2, 1877
Twomey, D. H.....Jan. 28, 1876
Udden, Prof. J. A., Rock Island, Illinois.....June 29, 1894
Vander Veer, A. W.....
Van Patten, John P.....May 25, 1883
Vermillion, W. D.....Feb. 29, 1868
Vincent, C. S.....June 29, 1883
*Vollmer, Emil.....Dec. 31, 1886
Vollmer, Henry, Feb. 25, '87, Aug. 27, '97
Vollmer, Henry, Jr.....Apr. 31, 1899
Von Maur, C. J.....Jan. 28, 1897
Wadsworth, Mrs. W. C...June 25, 1875
Walz, F. J.....Sept. 11, 1895
*Warnebold, A.....Apr. 27, 1886
Warwick, Gordon.....Jan. 11, 1869
Washburn, Geo. J.....Dec. 27, 1895
Watkins, C. S.....Feb. 26, 1868
*Wells, R. H.....Nov. 26, 1875
Wheeler, H.....Feb. 1, 1868
Wheeler, Moses, Rock Island, Illinois.....Sept. 27, 1889
Whitaker, J. H., May 25, '83, Dec. 27, '95
Whitaker, Miss Lottie Hall. Aug. 31, 1877
Whitcomb, E. H.....Apr. 30, 1898
White, E. M.....Dec. 27, 1895
White, Jarvis.....
*Williams, A. F.....June 28, 1881
Williams, Prof. —.....Aug. 31, 1883
Williamson, Prof. —, Rock Island, Ill.....Aug. 31, 1883
Williston, Rev. M. L. ....June 25, 1884
Willrodt, L. H.....Feb. 23, 1877
Wing, George.....Feb. 25, 1876
Wing, J. Q.....May 28, 1880
Witherell, L. R.....Apr. 29, 1881
Wolcott, Prof. P. C.....Nov. 29, 1889
Wood, George E.....Feb. 12, 1869
*Woodmansee, Ross.....May 25, 1883
*Woodward, B. B.....Aug. 31, 1877
*Worley, Dr. P. H.....Mar. 31, 1876
Wylie, J. S.....June 29, 1883
Wyman, Walter C., Chicago, Illinois.....Dec. 26, 1884
Young, J. B...Oct. 28, '69, Dec. 28, 1877
Young, Mrs. J. B.....Feb. 28, 1879
Zoeckler, John.....Mar. 31, 1899

LIST OF LIFE MEMBERS

WITH DATE OF ENROLLMENT.

Adams, Walker.....Aug. 31, 1877
Adams, Mrs. Walker.....Aug. 31, 1877
Andresen, H. H.....Jan. 28, 1881
Andresen, Richard.....Mch. 31, 1899
Bahls, John.....Oct. 3, 1877
Baker, Dr. J. W. H.....May 25, 1883
Balch, Frank A.....Oct. —, 1877
Ballord, Miss Bessie.....Mar. 31, 1899
Barris, Prof. W. H.....Mch. 31, 1899
Brewster, W. C.....Dec. 17, 1877
Brewster, Mrs. W. C.....Dec. 17, 1877
Burdick, Anthony.....Mch. 31, 1899
Cable, George W.....Oct. 31, 1884
Cable, George W., Jr.....Mch. 31, 1899
Carl, E. S.....Oct. 31, 1884
Crossett, Edward Clarke..Mch. 31, 1896
Davis, Frank O.....
Davison, Charles.....Aug. 31, 1877
Davison, Ella.....Aug. 31, 1877
Donaldson, Dr. John B. ..June 24, 1898
Dow, T. T.....Sept. 29, 1877
Farquharson, Dr. R. J....Mch. —, 1877
Fejervary, Mrs. Karoline..Aug. 31, 1877
Ficke, C. A.....Mar. 31, 1899

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Ficke, Mrs. C. A .....Mar. 31, 1899
Flagler, Col. D. W., Rock Isl'd Arsenal.....Apr. 25, 1879
French, George H..... ...Oct. 31, 1884
French, Mrs. Geo. W.....
French, Robert T.....Oct. 31, 1884
Gass, Rev. J.....Feb. 10, 1877
Grant, Mrs. James.....——, 1877
Griggs, F. H.....May 2, 1877
Griggs, Thomas W.....1899
Hall, Israel.....July 27, 1877
Hall, Capt. W. P.....Aug. 11, 1877
Hall, Mrs. W. P.....June 25, 1880
Hall, Channing.....Dec. 30, 1881
Hall, Grace.....June 25, 1880
Harrison, Charles E.....Mar. 31, 1899
Hazen, Dr. E. H.....Mar. 17, 1877
Hazen, Mrs. E. H.....Mar. 17, 1877
Hunting, Rev. S. S.....July 27, 1877
Hunting, Mrs. S. S.....July 27, 1877
Iles, Thomas, Jr.....Mch. 31, 1899
Kuhnen, Nicholas.....Oct. 31, 1884
Kuhnen, Nicholas, Jr.....Oct. 31, 1884
Leonard, Miss Nellie.....Mch. 31, 1899
Lynch, E. P..... ...Dec. 8, 1877
Mandeville, Col. H. M.....May 2, 1877
Mandeville, Mrs. H. M.....May 2, 1877
Marks, Mrs. M. L.....Apr. 30, 1886
McClelland, George P ....Oct. 17, 1877
McClelland, Thomas W...Dec. 8, 1877
McClelland, Mrs. T. W....Dec. 8, 1877
Millar, Mrs. S. B. R.....June 29, 1877
Miner, Mrs. Jennie True ..Oct. 17, 1877
Murphy, Hon. J. H.....Oct. 31, 1884
Newcomb, Mrs. Patience V.Feb. 23, '77
Parry, Dr. C. C.....Aug. 31, 1877
Parry, Mrs. C. C.....Aug. 31, 1877
Parry, John E..... .May 30, 1879
Parvin, Prof. T. S .....Mar. 30, 1877
Pendleton, E. H.....July 27, 1877
Pendleton, Mrs. E. H.....July 27, 1877
Phelps, J. B .....
Phelps, Mrs. J.B.....
Pratt, W. H.....Mar. 9, 1877
Pratt, Mrs. W. H .....Dec. 26, 1879
Price, Hon. Hiram .....Mar. 31, 1899
Putnam, Benjamin R.....Aug. 28, 1896
Putnam, Charles E.....Mar. 6, 1877
Putnam, Mrs. C. E.....Mar. 6, 1877
Putnam, Charles M..... .Mar. 6, 1877
Putnam Edward K .....Jan. 5, 1898
Putnam, Elizabeth D..... Mar. 6, 1877
Putnam, George R.....Mar. 6, 1877
Putnam, H. St. Clair.....Mar. 6, 1877
Putnam, John C.....Mar. 6, 1877
Putnam, Joseph Duncan ..Apr. —, 1876
Putnam, W. Clement.....Mar. 6, 1877
Renwick, James.....May 2, 1877
Renwick, William .....May 2, 1877
Renwick, Mrs. William ...May 2, 1877
Renwick, William Godwin.Mar. 31, 1899
Richardson, J. J.....Mar. 31, 1899
Roberts, Edward C .....Mar. 31, 1899
Roberts, Mrs. U. N.....
Robinson, J. Frank.....Mar. 31, 1899
Robinson, Capt. T. J.....Mar. 29, 1878
Roddewig, Paulo ... .Mar. 31, 1899
Rothschild, Isaac .....Oct. 31, 1884
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Sheldon, Mrs. D. S.....June 29, 1877
Sheldon, Miss Sarah Foote.Aug. 25, 1882
Sieg, Miss Alice .....Dec. 26, 1884
Smetham, Richard.....Oct. 31, 1884
Smith, S. F ....Aug. 31, 1877
Smith, Mrs. S. F.....Aug. 31, 1877
Spink, Henry .....May 2, 1877
Stuyvesant, M. L .....Oct. 2, 1877
Stuyvesant, Mrs. M. L .....Oct. 2, 1877
Thompson, James .....Oct. —, 1877
Van Patten, Miss Dorothy. May —, 1884
Vollmer, Henry, Jr .....Mar. 31, 1899
Whitaker, Mrs. Lottie Hall.Aug. 31, 1877
Woodward, B. B.....Aug. 31, 1877
Zoeckler, John.....Mar. 31, 1899

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OCTOBER 1, 1899.

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Roberts, Horace.
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Bull, Mrs. Mary Putnam (for publishing Proceedings)	$9,500	Parker, Mrs. J. M. (with interest to date)	$1,400
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Newcomb, Mrs. P. V. (lot)	4,500		
Parker, J. M	1,000		

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PLATE I.

Fig. 1. *Agallia 4-punctata*; *a*, adult; *b*, larva, side view; *c*, larva, dorsal view; *d*, face; *e*, elytron; *f*, ♀, *g*, ♂ genitalia.

Fig. 2. *Agallia novella*; *a*, adult; *b*, larva, side view; *c*, larva, dorsal view; *d*, face; *e*, elytron; *f*, ♀, *g*, ♂ genitalia; *h*, ♂, side view.

Fig. 3. *Agallia sanguinolenta*; *a*, adult; *b*, larva, side view; *c*, larva, dorsal view; *d*, face; *e*, elytron; *f*, ♀, *g*, ♂ genitalia.

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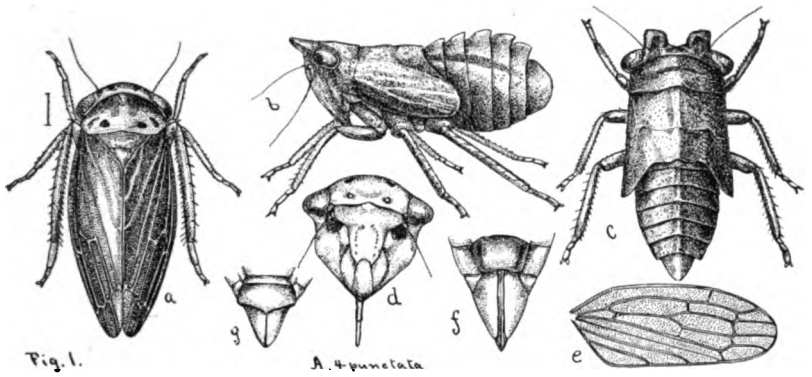

Fig. 1. A. 4-punctata

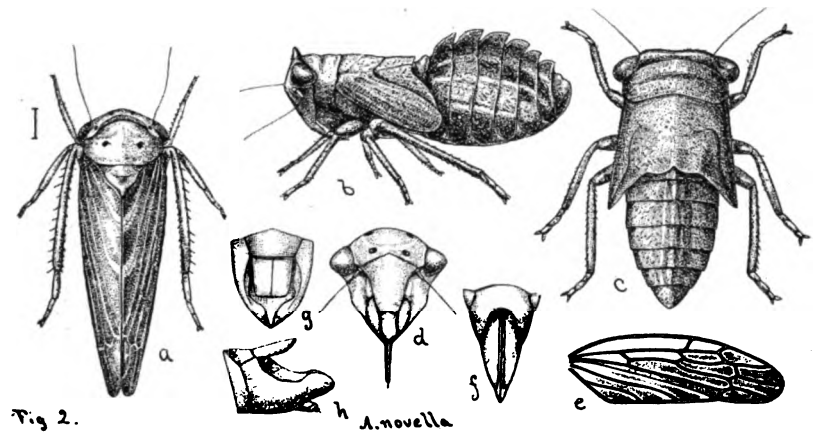

Fig 2. A. novella

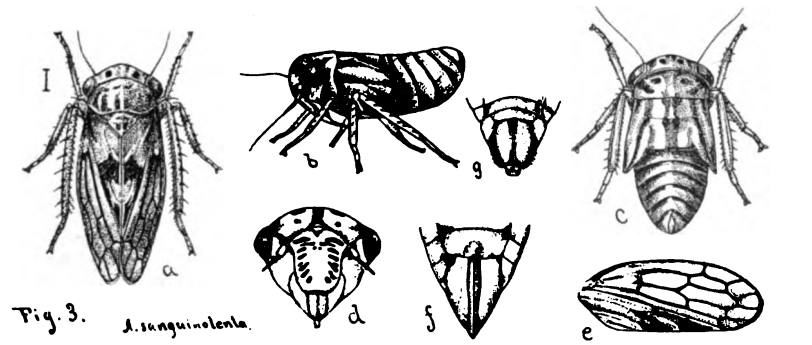

Fig. 3. A. sanguinolenta.

Osborn and Ball on Jassoidea.

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PLATE II.

Fig. 1. *Macropsis apicalis*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, larva; *f*, twig with eggs; *g*, egg, much enlarged.

Fig 2. *Bythoscopus distinctus*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e* elytron; *f*, larva.

Fig. 3. *Pediopsis tristis*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, larva.

Fig. 4. *Pediopsis ferruginoides*; *a*, adult; *b*, face; *c*, elytron; *d*, larva.

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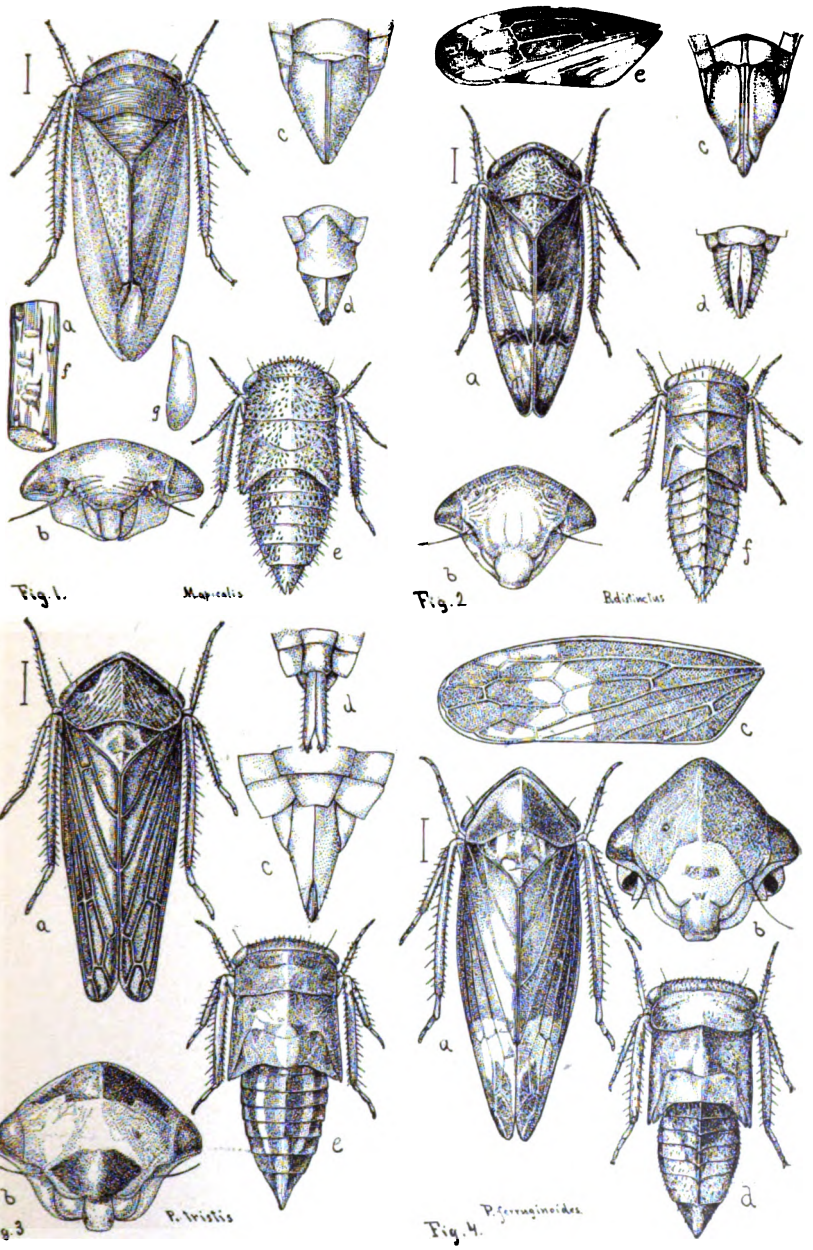

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PLATE III.

Fig 1. *Idiocerus alternatus*; *a*, adult; *b*, ♀, *c*, ♂ genitalia; *d*, elytron; *e*, larva; *f*, twig showing eggs; *g*, egg, much enlarged.

Fig. 2. *Idiocerus moniliferæ*; *a*, adult; *b*, ♂, *c*, ♀ genitalia; *d*, elytron; *e*, larva.

Fig. 3. *Idiocerus brunneus*; *a*, adult; *b*, ♀, *c*, ♂ genitalia; *d*, elytron; *e*, nymph; *f*, base, *g*, apex of antenna.

Fig. 4. *Idiocerus maculipennis*; *a*, adult; *b*, ♀, *c*, ♂ genitalia; *d*, elytron; *e*, nymph.

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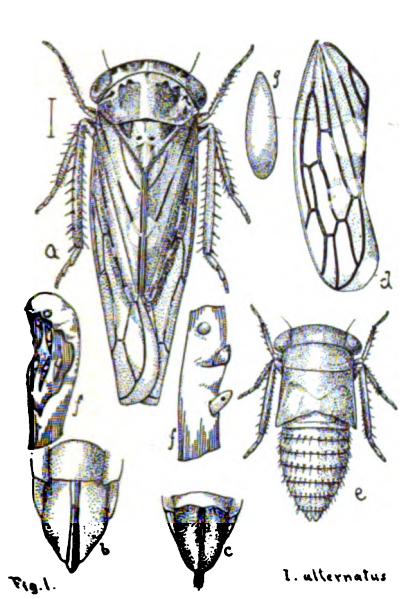

Fig. 1. I. alternatus

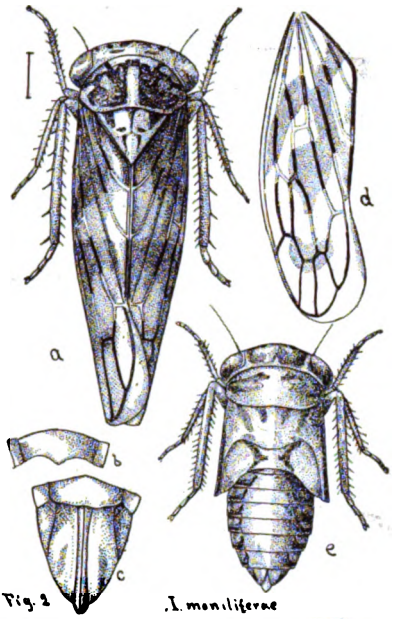

Fig. 2 I. moniliferae

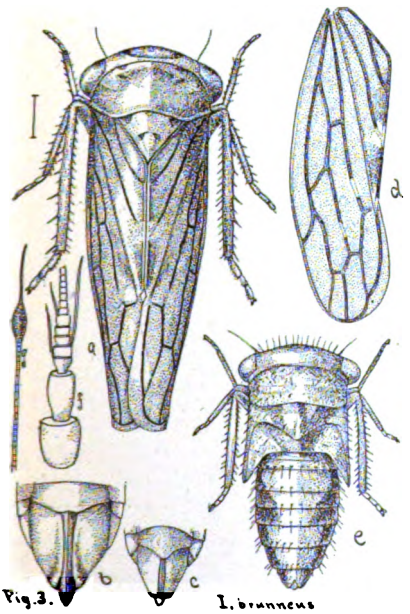

Fig. 3. I. brunneus

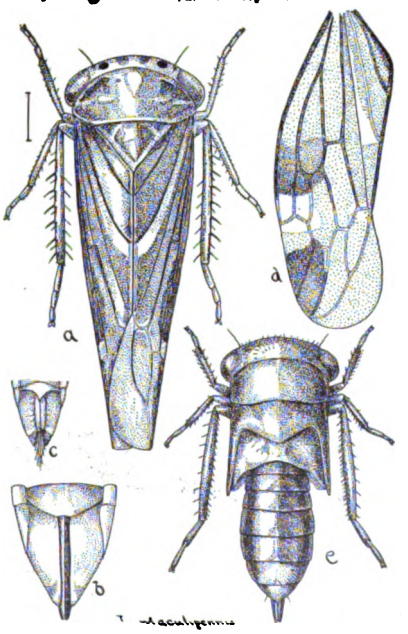

FIG. 4

Osborn and Ball on Jassoidea.

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PLATE IV.

Fig. 1. *Lonatura* (?) *megalopa*; *a*, adult ♂; *b*, adult ♀; *c*, face; *d*, ♀, *e*, ♂ genitalia; *f*, elytron.

Fig. 2. *Lonatura catalina*; *a*, long-winged, *b*, short-winged ♂; *c*, short-winged ♀; *d*, face; *e*, ♀, *f*, ♂ genitalia; *g*, elytron; *h*, nymph.

Fig. 3. *Driotura gammaroidea*; *a*, short-winged, *b*, long-winged ♀; *c*, face; *d*, ♀, *e*. ♂ genitalia.

Fig. 4. *Driotura robusta*; *a*, short-winged ♀; *b*, face; *c*, ♀; *d*, ♂ genitalia; *e*, nymph.

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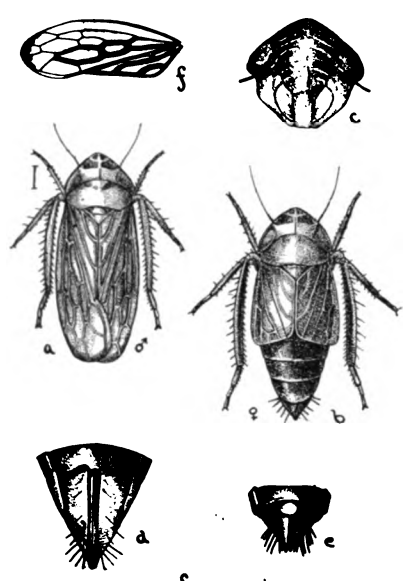

L. megalopa

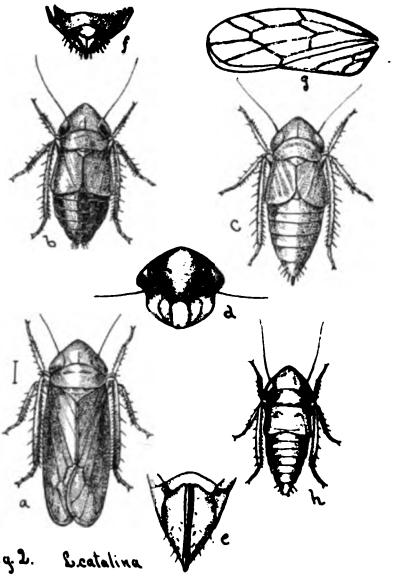

Fig 2. L. catalina

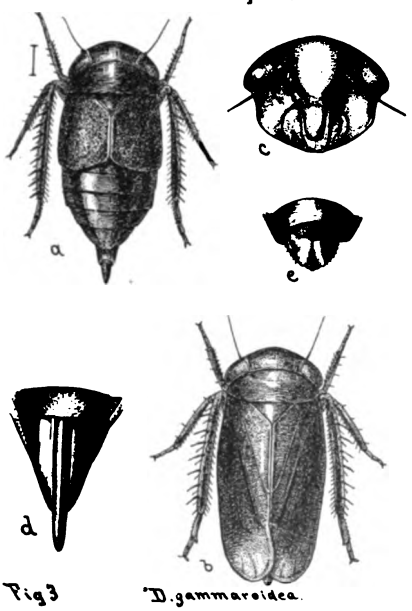

Fig 3 D. gammaroidea.

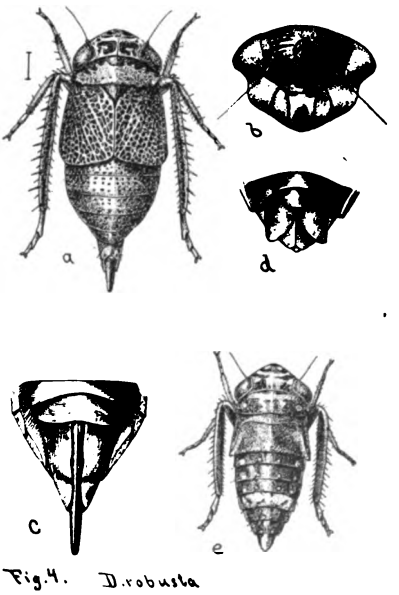

Fig. 4. D. robusta

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PLATE V.

Fig. 1. *Athysanus curtisii*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, elytron; *f*, nymph.

Fig. 2. *Athysanus bicolor*; *a*, adult ♀; *b*, adult ♂; *c*, face; *d*, ♀, *e*, ♂ genitalia; *f*, elytron; *g*, nymph,

Fig. 3. *Athysanus striatulus*; *a*, adult; *b*, ♀, *c*, ♂ genitalia; *d*, elytron; *e*, nymph.

Fig. 4. *Athysanus striola*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, elytron; *f*, nymph.

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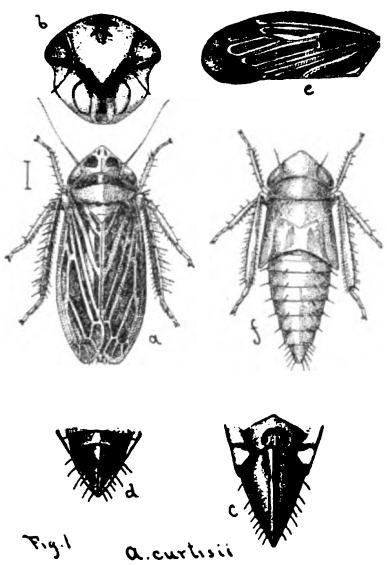
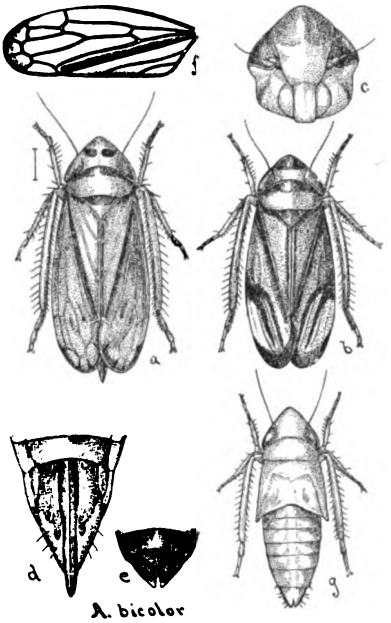
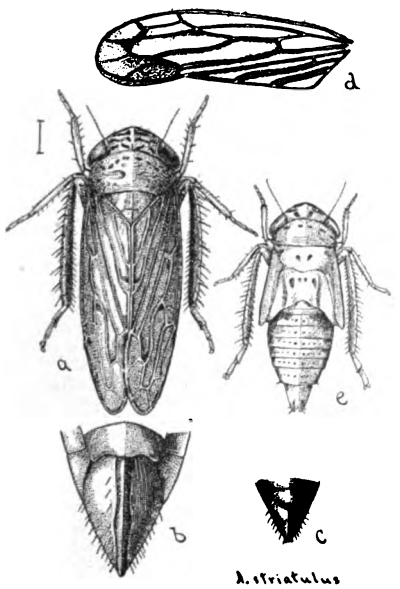


Fig. 1 A. curtisii



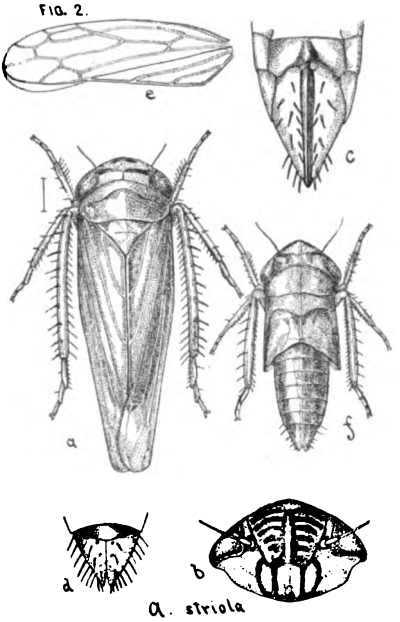
A. bicolor

FIG. 2.



A. striatulus

FIG 3.



A. striola

FIG. 4.

Osborn and Ball on Jassoidea.

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PLATE VI.

Fig. 1. *Athysanus extrusus*; *a*, short-winged ♀; *b*, ♀; *c*, ♂ genitalia; *d*, nymph.

Fig. 2. *Dorycephalus vanduzei*; *a*, adult ♀, brachypterous; *b*, face; *c*, side view of head; *d*, ♀ genitalia; *e*, elytron; *f*, leg.

Fig. 3. *Phlepsius altus*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, elytron; *f*, nymph.

Fig. 4. *Phlepsius nebulosus*; *a*, adult; *b*, face; *c*, ♀, *d*, ♂ genitalia; *e*, nymph.

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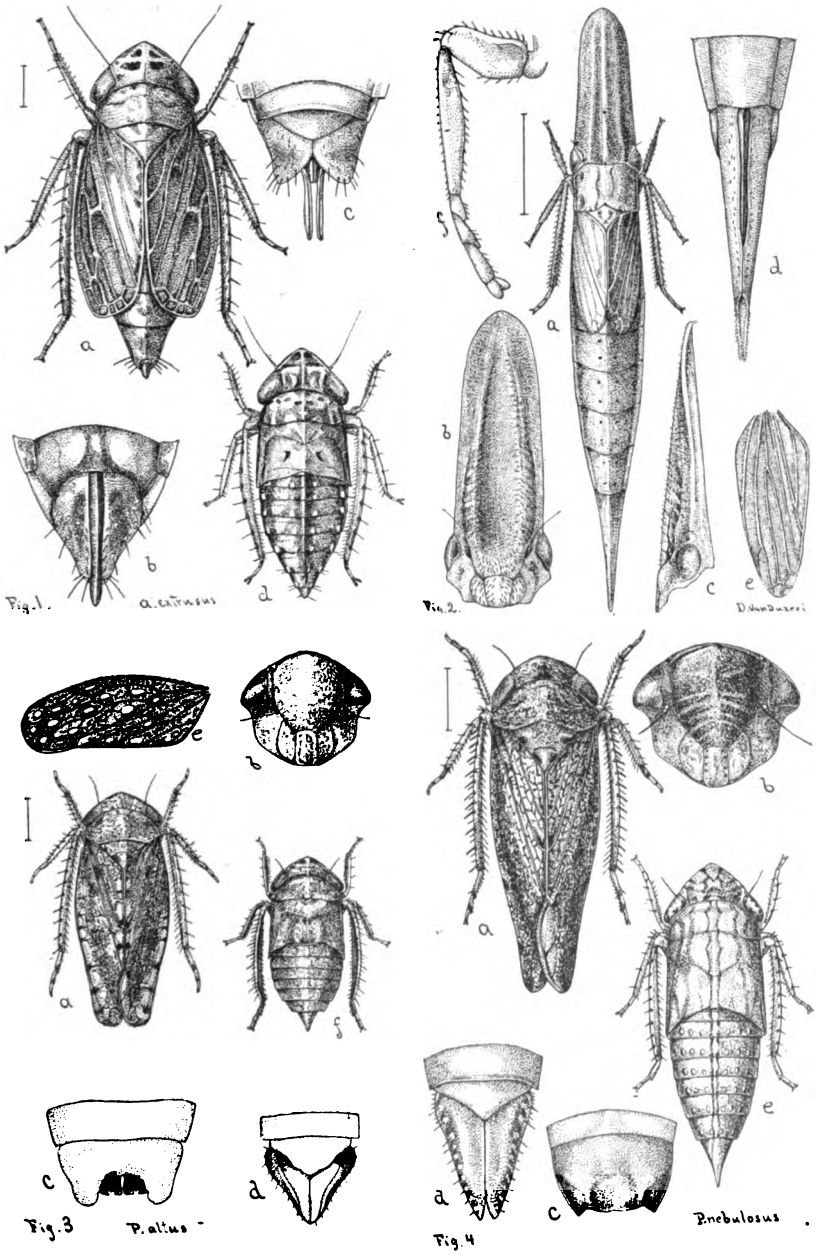

Osborn and Ball on Jassoidea.

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PLATE VII.

All the figures are magnified two diameters.

Fig. 1. *Podisma polita*, ♂, side view. Divide, Oregon.

Fig. 2. *Podisma polita*, ♂, top view. Same specimen as Fig. 1.

Fig. 3. *Melanoplus blandus*, ♂, side view. Summit of Mt. Wilson, Altadena, Cal.

Fig. 4. *Melanoplus femur nigrum*, ♂, side view. San Francisco Mts., Arizona.

Fig. 5. *Melanoplus varicus*, ♂, top view. Tehachipi, Cal.

Fig. 6. *Melanoplus varicus*, ♂, side view. Same specimen as Fig. 5

Fig. 7. *Melanoplus pinctus*, ♂, side view. San Diego, Cal.

Fig. 8. *Melanoplus truncatus*, ♂, side view. San Francisco Mts., Arizona.

Fig. 9. *Melanoplus phoetaliotiformis*, ♂, side view. Gazelle, Cal.

Fig. 10. *Melanoplus incultus*, ♂, side view. Larimer Co., Col.

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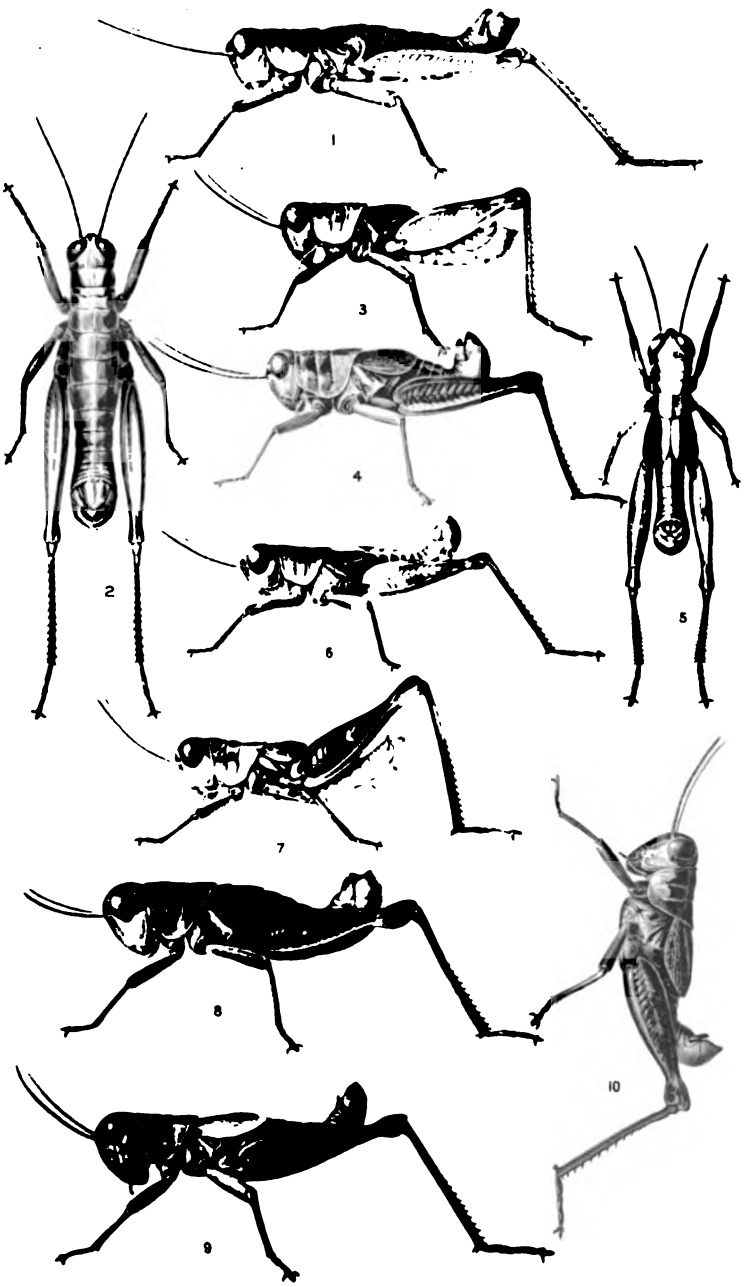

Scudder – Supplement to Forficul. of Melanesia. Henry Blake, ad nat.

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PLATE VIII.

All the figures are magnified two diameters.

Fig. 1. *Melanoplus franciscanus*, ♂, side view. San Francisco Mts., Ariz.
Fig. 2. *Melanoplus franciscanus*, ♂, top view. Same specimen as Fig. 1.
Fig. 3. *Melanoplus ablutus*, ♂, side view. Wawona, Cal.
Fig. 4. *Melanoplus nanus*, ♂, side view. Berkeley, Cal.
Fig. 5. *Melanoplus ligneolus*, ♂, side view. Benicia, Cal.
Fig. 6. *Melanoplus ligneolus*, ♂, top view. Same specimen as Fig. 5.
Fig. 7. *Melanoplus dealbatus*, ♂, top view. Ceres, Cal.
Fig. 8. *Melanoplus dealbatus*, ♂, side view. Ceres, Cal.

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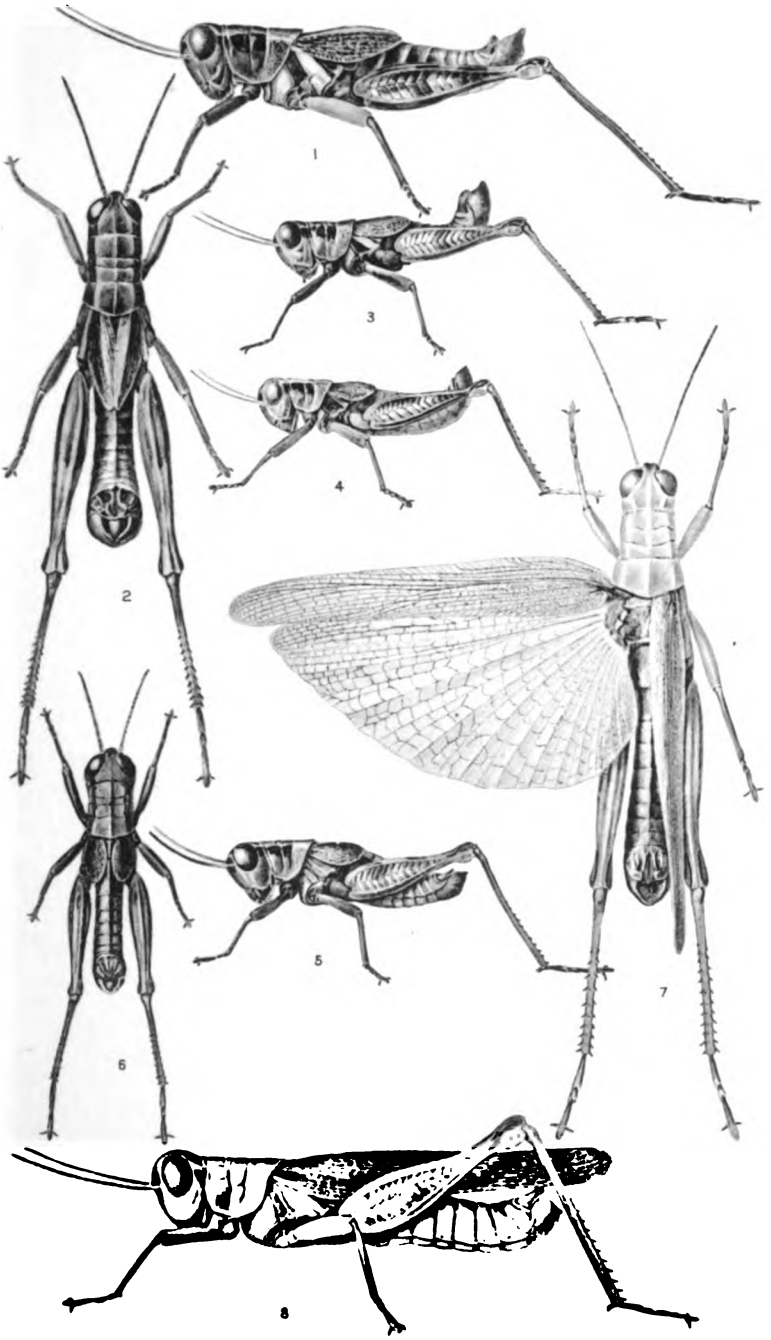

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PLATE IX.

All the figures are magnified two diameters.

Fig. 1. *Melanoplus pilatus*, ♀, top view. Near Ft. Collins, Col.
Fig. 2. *Melanoplus pilatus*, ♀, side view. Same specimen as Fig. 1.
Fig. 3. *Melanoplus ascensus*, ♂, side view. Mt. Shasta, Cal.
Fig. 4. *Melanoplus validus*, ♂, side view. Grant's Pass, Oreg.
Fig. 5. *Melanoptus validus*, ♂, top view. Same specimen as Fig. 4.
Fig. 6. *Melanoplus algidus*, ♂, side view. Mary's Peak, Benton Co., Oreg.
Fig. 7. *Melanoplus debilis*, ♂, side view Ashland, Oreg.

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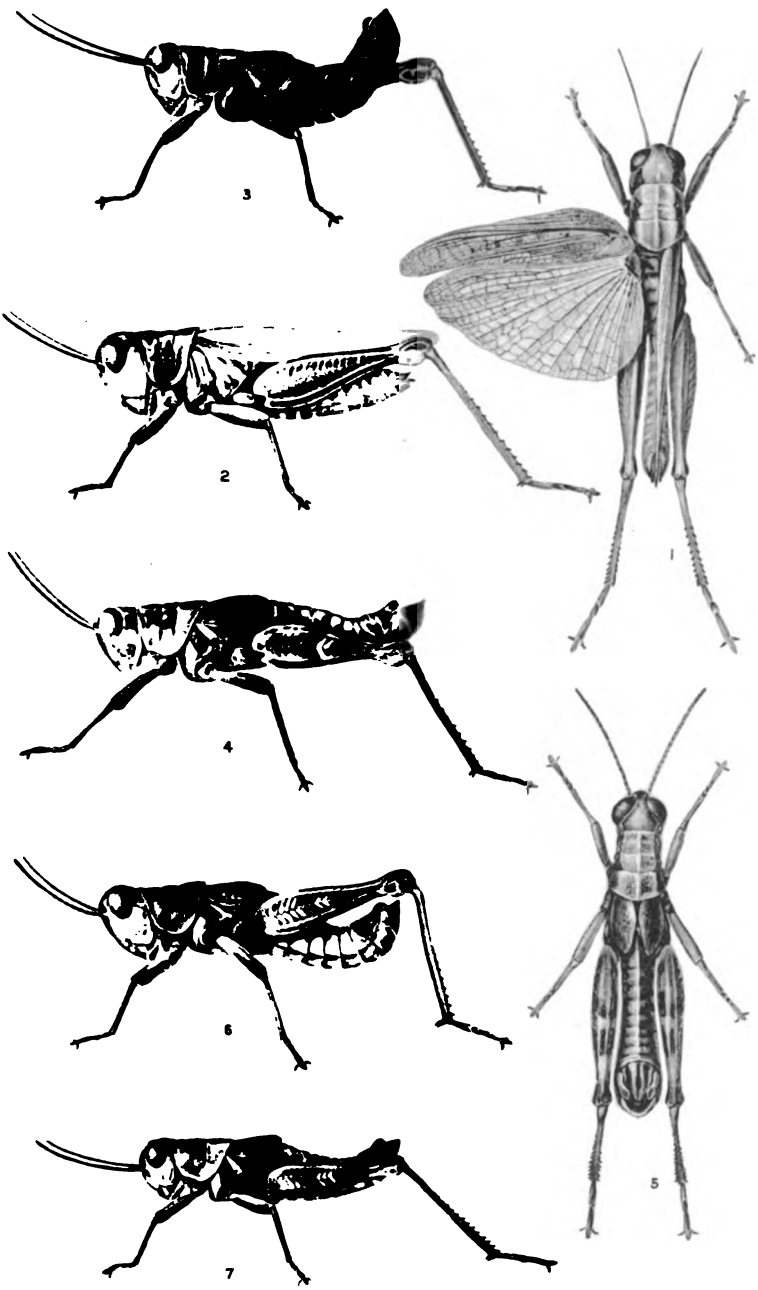

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PLATE X.

Fig. 1. *Schenonnardus paniculatus* Trelease.

Fig. 2. *Bouteloua oligostachya* Torr.

Fig. 3. *Agropyron spicatum* S. &. S.

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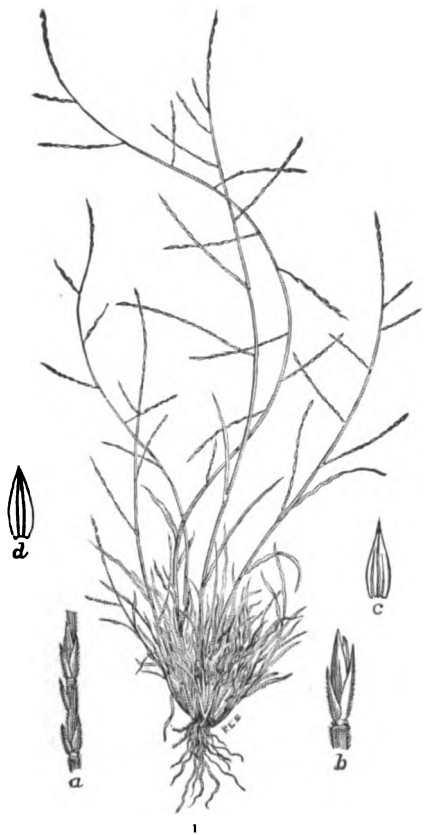

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PLATE XI.

Fig. 1. *Poa Wheeleri* Vasey.

Fig. 2. *Calamagrostis purpurascens* R. Br.

Fig. 3. *Savastana odorata* Scribn.

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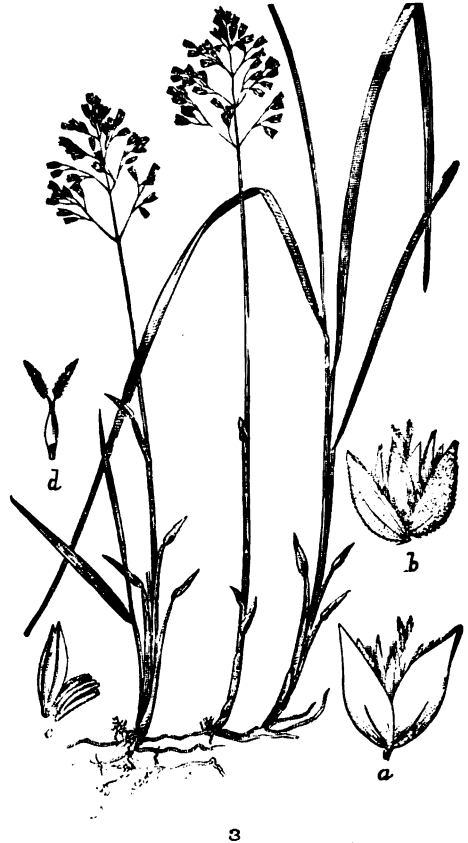

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PLATE XII.

Fig. 1. *Festuca Kingii* Scribn.

Fig. 2. *Bromus breviaristatus* Buckley.

Fig. 3. *Distichlis spicata* Greene.

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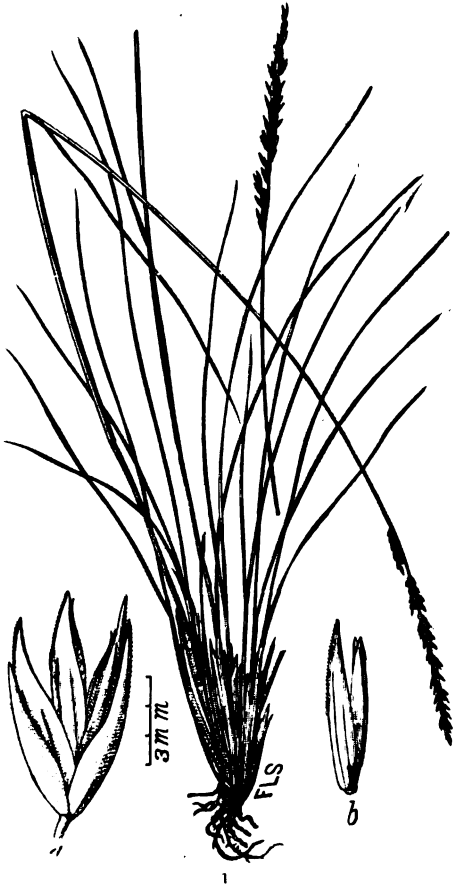

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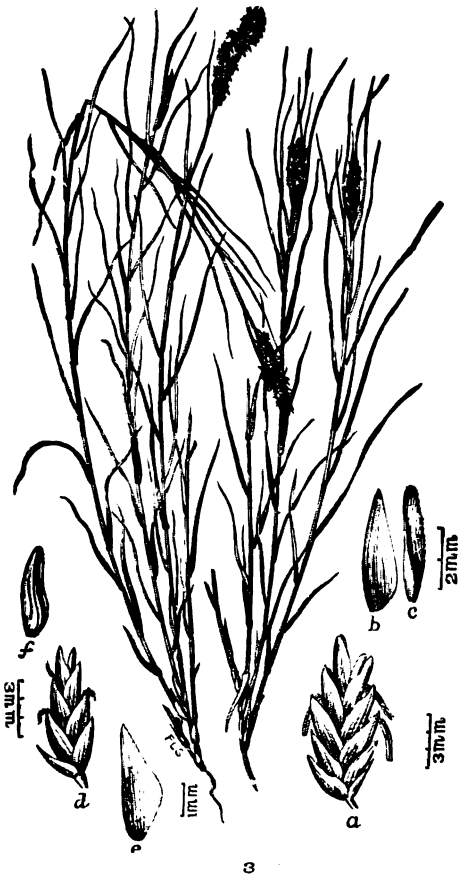

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PLATE XIII.

Fig. 1. *Eriocoma cuspidata* Nutt.

Fig. 2. *Hordeum jubatum* L.

Fig. 3. *Stipa comata* Trin. & Rupr.

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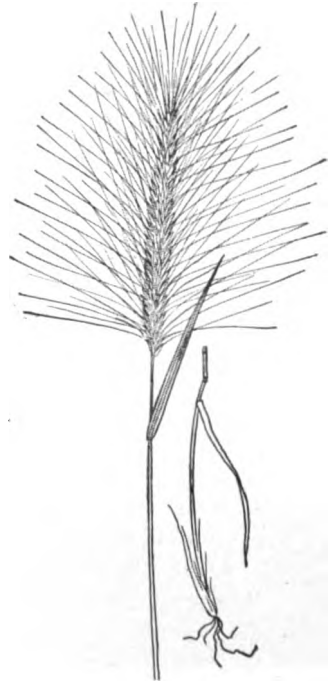

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PLATE XIV.

Fig. 1. *Phleum alpinum*, showing general habit of the plant and a spikelet with flower displayed.

Fig. 2. *Phleum alpinum* var. *Scribnerianum*, showing general habit of plant and spikelet with flower displayed.

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PLATE XV.

Fig. 1. *Melica subulata*, showing general habit of plant with spikelet to the right.

Fig. 2. *Melica spectabilis*, with spikelet to the right.

Fig. 3. *Melica Pammelii*, with spikelet to the right.

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PLATE XVI.

Showing a view of landscape in the region of Dome Lake, Dome Rock in the distance. One of the numerous small lakes shown at the base of the hills near the margin of a pine swamp. Most of the trees consisting of *Pinus Murrayana* and a few *Picea Engelmannii*. The forest only partially destroyed by fire. Grassy meadow surrounding the lake. Drawing made by Miss King from a photograph.

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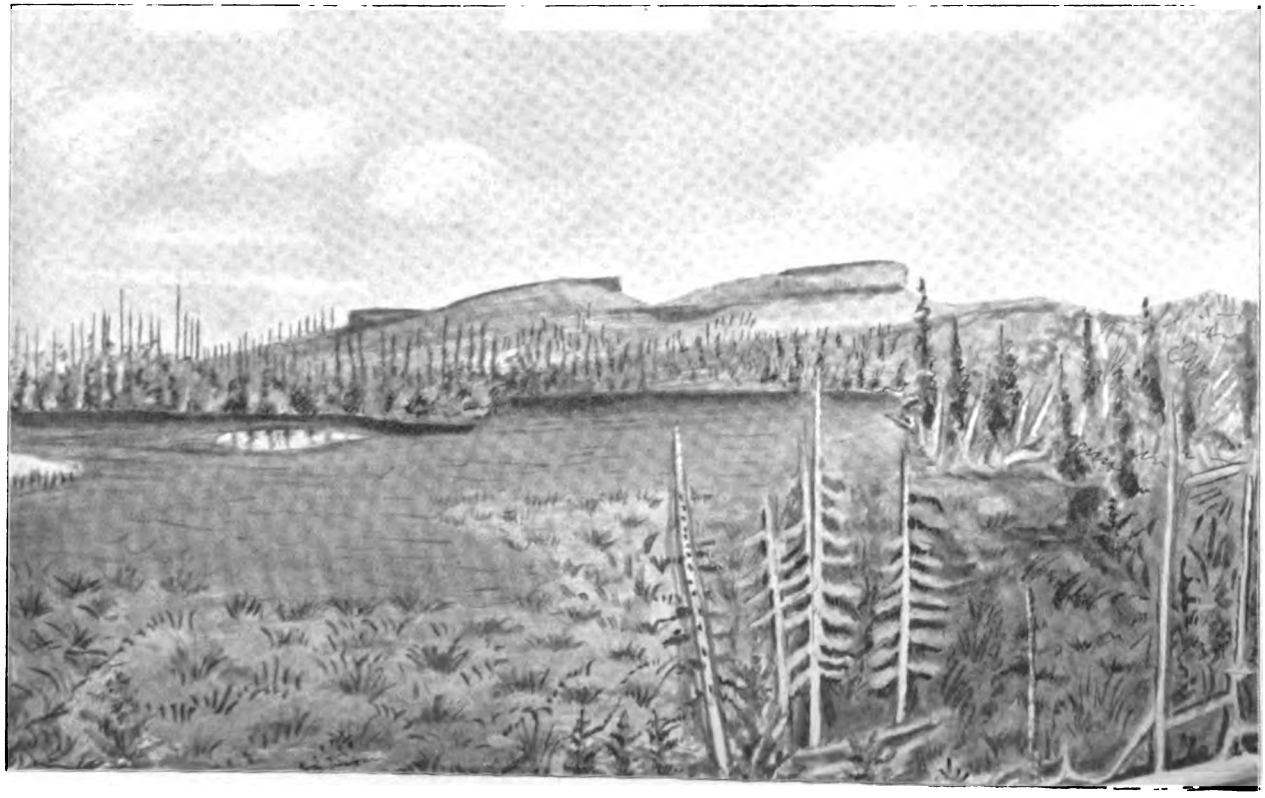

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PLATE XVII.

Fig. 1–3. Teleutospores of *Puccinia uniformis* n. sp.

Fig. 4–5. Uredospores of *Puccini uniformis.*

Fig. 6. Leaf of *Rumex paucifolius*, showing soil.

Fig. 7–11. Teleutospores of *Puccini Crandallii* n. sp.

Fig. 12. Conidiophores of *Microstroma americanorum* n. sp.

Fig. 13. Conidia of *Microstrisna americanorum.*

Fig. 14. Optical view of *Septoria Jamesii* n. sp.

Fig. 15. Spores of *Septoria Jamesii.*

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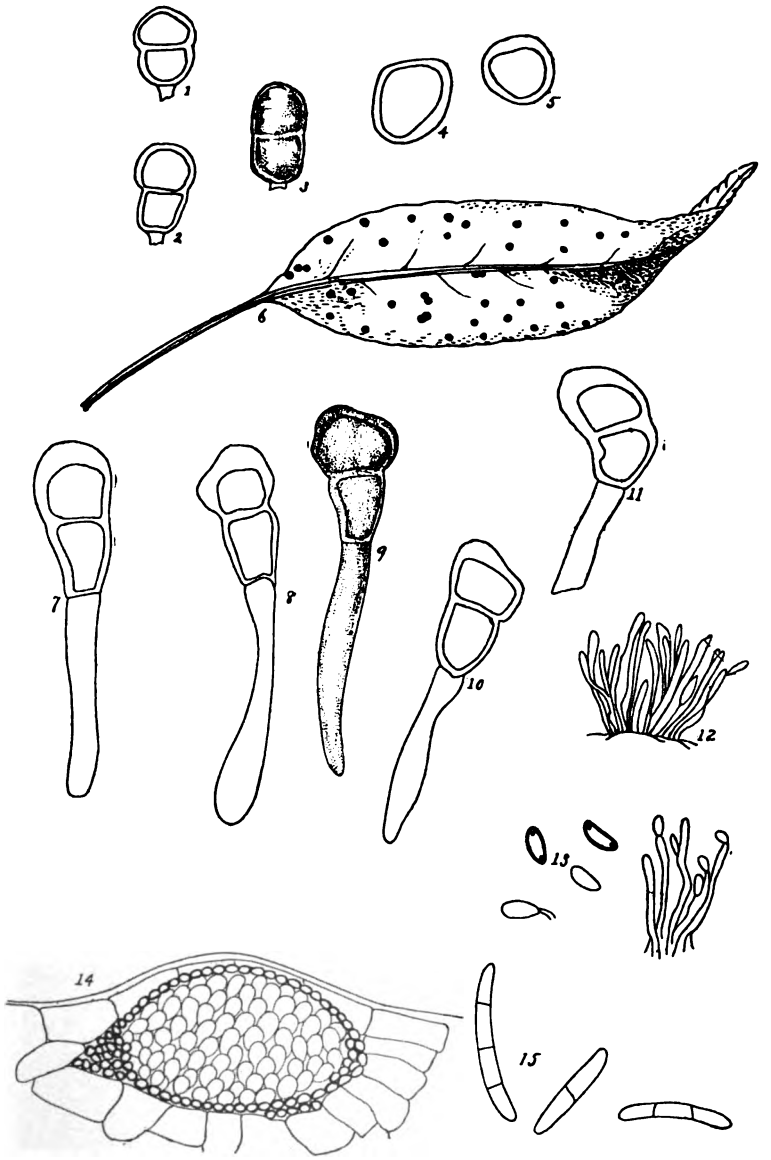

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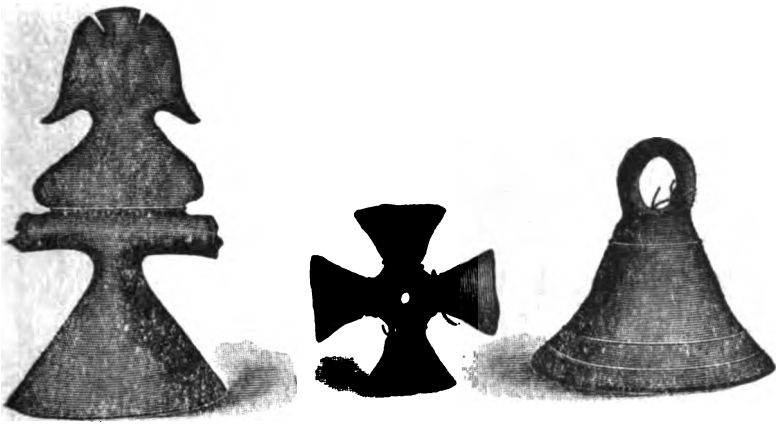

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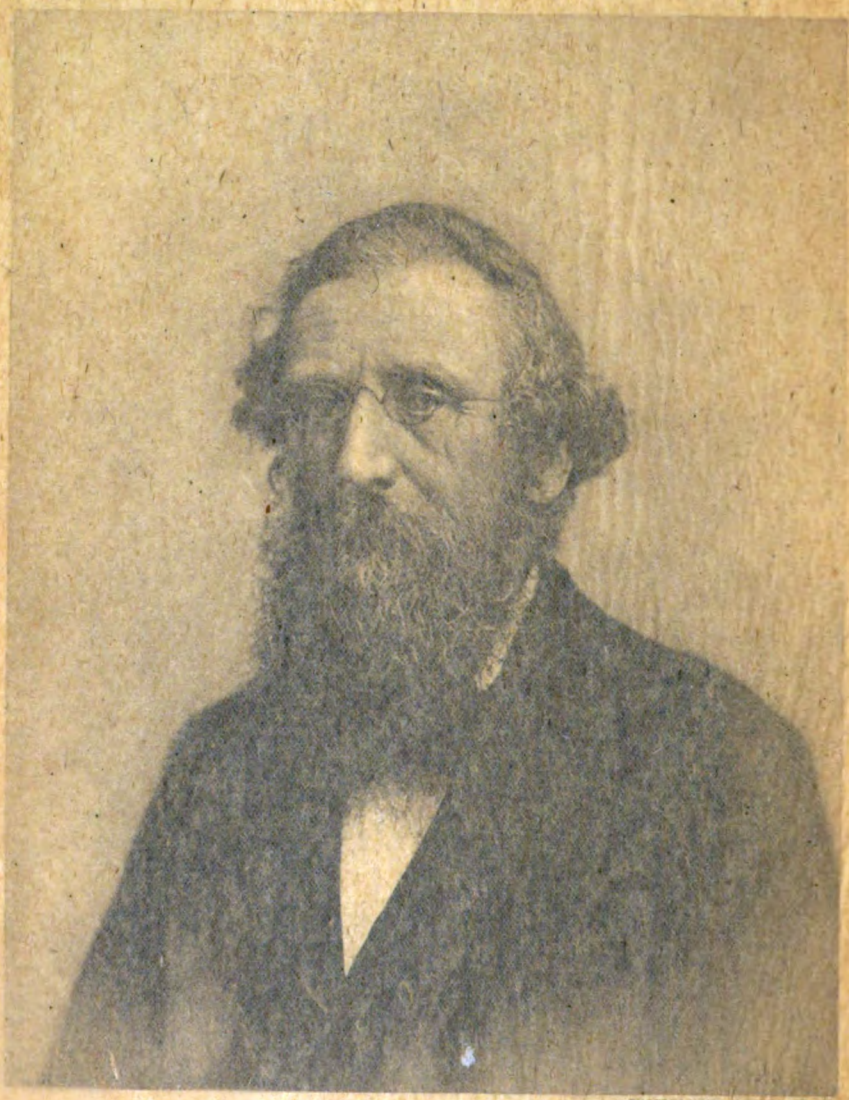

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The authors of the various papers are alone responsible for what is contained in them
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PREFACE.

The Publication Committee of the Davenport Academy of Sciences takes great pleasure in presenting to the scientific world Volume VIII. of its proceedings.

It is nearly two years since the last volume was issued, and during this period many changes have occurred in the Academy. It has expanded from an institution with a small building into one occupying conveniently connected buildings upon one of the most desirable corners for a museum in Davenport.

The chief work of the Academy during the year 1900 was the remodeling of the old Presbyterian church recently acquired and building a commodious two-story brick passage-way connecting it with the Academy proper. The auditorium of the church has been redecorated and is named "Science Hall." It is planned to begin a course of scientific lectures this coming year, which, it is hoped, will be of great benefit to the community.

The scientific collections of Griswold College, which have been presented to the Academy, have been placed in the basement, and the Academy's valuable collection of birds has been carefully rearranged and labelled, as well as other departments of the zoölogical collections.

The card catalogue of the library has been completed to 1901, and the Academy now realizes more fully the value of the valuable scientific library it has received through its publications and gifts.

It is with deep regret that we announce the death of Dr. W. H. Barris, our beloved Curator and Corresponding Secretary, on June 10, 1901. His interest in the Academy from its beginning, his scientific attainments, and his charming personality make it difficult to fill his place. He was President of the Academy in 1876 and was a member of the Publication Committee from the publishing of the first volume.

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Volume VIII. is opened with a biographical sketch and portrait of one of the founders, a former President and long time Curator of the Academy, Prof. W. H. Pratt. The biography, written by his friend Dr. C. H. Preston, records the debt of gratitude the Academy owes Prof. Pratt for his years of valuable and disinterested work in its behalf.

Two papers, one by Prof. Samuel H. Scudder of Cambridge, Mass., and Prof. T. D. A. Cockerell of Las Vegas, N. M., and one by Prof. Frederick Starr of the University of Chicago, have been presented to the Academy and are in progress of preparation for Volume IX., which, it is expected, will be published soon.

Acknowledgments are due to Prof. J. A. Udden and son of Rock Island, Ill., for their work in preparing the index of this volume.

DAVENPORT, October 18, 1921.

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WILLIAM HENRY PRATT.

BIOGRAPHICAL SKETCH BY C. H. PRESTON.

To no one of its many earnest members is the Davenport Academy of Sciences more deeply indebted than to W. H. Pratt, the honored subject of this brief sketch. One of the four founders of the Academy, and a Life Member since 1877, he devoted himself to its interests throughout the best years of his life, counting no sacrifice of time or strength too great to be freely made for its welfare. As its President in 1880, as Recording and as Corresponding Secretary for many years, as a Trustee continuously from the beginning, as a member of the Publication Committee from its inception, and as Curator from 1875 until his removal from the city, October, 1890, he never for a moment neglected the duties of any position, but discharged them all faithfully and as a labor of love.

William Henry Pratt was born in Bridgewater, Mass., September 6, 1822, and died, after several years of failing health, in Minneapolis, Minn., December 3, 1893. With a natural love for investigation and study, he had, as a boy, but little time to devote to books and attended school but a few months in his life. His early youth was spent mostly at work in his father's sawmill in Bridgewater, and in 1838 the family removed to Chicago, where he followed the carpenter's trade. Here, in 1849, he was united in marriage to Miss Elizabeth M. Christian, and from this time until 1857, being an expert penman and accountant, he gave lessons in writing and book-keeping in evening schools, traveling from town to town throughout the State of Illinois, making his home first in Tremont and later in Peoria.

During these years he did much systematic reading, mostly in the direction of natural science, an interest in which increased with each succeeding year of his life.

In 1857 he removed with his family to Davenport, intending to open a commercial school, but finding one already established, he purchased a half interest of its owner, Joseph C. Lopez, and took charge

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of the department of penmanship in this, the first "Davenport Commercial College." In 1859 "Professor Pratt," as he was now familiarly known, became sole proprietor of the school, and in 1865 he entered into partnership with Messrs. Worthington and Warde, but left the business in the fall of that year to take charge of the teaching of penmanship in the Davenport public schools, which position he held for fifteen years.

In his note book, under date December 7, 1867, occurs the following: "Went with Mr. Barler to Mr. Eads' office to-night to talk about organizing a Natural History Society." A little further on is this simple entry of unforeseen importance in the intellectual history of Davenport: "Dec. 14, 1867. Had another meeting at Mr. Eads' office to-night and organized the Davenport Academy of Natural Sciences — was elected Secretary." This was the beginning of an institution which, owing largely to his untiring labors, has steadily increased in influence with the advancing years.

To this organization all the time he could spare from his school and home duties was thenceforth given, and through it he was disinterestedly helpful to many studious young men, introducing them to, and wisely guiding them in, the paths of scientific research. More than one young man to-day, who has gained distinction as a student of nature, gladly acknowledges indebtedness to his helping hand. It was due to Mr. Pratt's influence and devotion to nature-study that J. Duncan Putnam, then a lad at school, became interested in entomological science.

Through his active influence in securing donations and exchanges from far and near the shelves of the Academy museum were continually enriched by valuable accessions in addition to his own frequent donations. These included, besides the results of his geological and archæological explorations for years, interesting collections of local shells and of animal skulls, and his entire private mineralogical collection numbering from one to two thousand specimens.

It was largely through him that the wealth of flint and stone implements, with other Indian relics so laboriously collected by Captain W. P. Hall, was added to the Academy treasures, and that the Parvin, Allen, and other collections were entrusted to its keeping.

For years, without pay and without thought of pay, he economized every fragment of time for Academy work; and never for a moment

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were the care and labor he gave to it measured by the small money return in its power to make.

Besides classifying, labelling and arranging all specimens as received, he provided matter of interest for its meetings, conducted its correspondence and attended to the exchange of the Proceedings, in the publication of which he assisted. All accessions of whatever kind — to museum, library, correspondence, membership, etc., — he recorded systematically in separate books. His patient hand carefully restored, piece by piece, many of the most interesting specimens of ancient pottery in the Academy's collection which, when received from the mounds, had been in what seemed a hopelessly fragmentary condition; and a large part of the delineations for the earlier volumes of the Proceedings were laboriously and accurately made by him.

He organized from the younger Academy members various working sections — botanical, geological, historical, etc., — and assisted each in its especial pursuits.

One of his latest works, and one very near to his heart, was the giving of lessons, illustrated by the Academy's collections, to classes visiting it from the public schools. This was an experiment original with himself and he proved its practicability by giving a well-attended course of six lectures on as many topics, each successively to all the High School classes and the eighth and ninth grades in the grammar schools.

He had much of the teacher's instinct and was firmly convinced that the usefulness of the schools might be largely increased by utilizing as object lessons the collected riches of the museum as well as those of the workshop and field. He felt, too, that the interest thus awakened would react to the advantage of natural science, recruiting her ranks perennially with enthusiastic young workers. The diffusion of knowledge he looked on as an essential part of the Academy's work, and as a duty personal to each student of science as well. To this end he had at one time during his connection with the schools prepared and delivered a course of popular science lectures in many small places throughout the State of Illinois and had lectured on scientific subjects before teachers' institutes and elsewhere whenever occasion offered.

It was his pleasure always to have with him on the frequent short exploring trips which, through life, were his chief recreation, a group of young or old friends intent, like himself, on learning from nature at first hand.

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Mr. Pratt was on terms of warm friendship with many scientific men of note with whom he was brought in relation through his position as corresponding secretary and curator of the Davenport Academy of Science. A visit to Agassiz's museum in earlier years he remembered as one of the "treats" of his life. In 1878 a new species of *gyroceras*, discovered by himself, was dedicated to him by his associate and friend, Dr. W. H. Barris. It is illustrated, as drawn and etched by his own hand, in plate x., vol. II., of the Proceedings.

With no time for extended authorship he yet prepared many valuable papers for the Academy publications. In addition to his annual reports as Curator and President, and careful descriptions of the numerous mound explorations he conducted, the following is a list of his principal writings:

1. Report on the Meteoric Shower of Nov. 14, 1868. *Proc.*, Vol. I., p. 14.
2. Force and Motion. *Proc.*, Vol. I., p. 75.
3. Report on Geol gical Examination of Section of Bluff, West Davenport. *Proc.*, Vol. 1, p. 96.
4. List of Land and Fresh Water Shells Found at Davenport, Iowa. *Proc.*, Vol. I., p. 165.
5. Description of a Probably New Unio Shell Found on the South Bank of the Mississippi, Opposite Rock Island. *Proc.*, Vol. I., p. 167.
6. Shell Money and Other Primitive Currencies. *Proc.*, Vol. II., p. 38.
7. Shell Beds of the Vicinity of Davenport. *Proc.*, Vol. II., p. 156.
8. Left-handedness In Our City Schools. *Proc.*, Vol. II., p. 186.
9. Reminiscences of the Early History of the Academy. *Proc.*, Vol. II., p. 193.
10. Lightning Phenomena. *Proc.*, Vol. III, p. 91.
11. Report on Section of Bluff at Sixth Street. *Proc.*, Vol. III., p. 127.
12. An Artesian Well at Moline. *Proc.*, Vol. III., p. 181.
13. A Biographical Sketch of J. Duncan Putnam. *Proc.*, Vol. III., p. 198.
14. Report on Work of the Academy in Connection with the Public Schools. *Proc.*, Vol. VI., p. 290.
15. Note on *Mus musculus*, the Singing Mouse. *Proc.*, Vol. II, p. 190.
16. Note on Curious Relic from Cook Farm. *Proc.*, Vol. II., p. 256.
17. Note on Inscribed Rock at Sterling, Illinois. *Proc.*, Vol. III., p. 89.
18. Note on Geological Section of Bluff at East Davenport. *Proc.*, Vol. III., p. 106.
19. Note on the Chambers Rod and the Phœnix Mill Fire. *Proc.*, Vol. III., p. 179.
20. A Glimpse Into Our Future. *Proc.*, Vol. VIII., p. xiv.

Though quiet and unassuming, Mr. Pratt was a man of very decided and firm convictions. With strong likes and dislikes, he had no patience with dishonesty or insincerity in any shape—only the straight-

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forward man could be his friend. Devoted to his family, his daily duties and the pursuit of the studies he loved, his life was simple and unobtrusive and his personal wants were but few. His home was ideal in the closeness of its every tie, the loving solicitude of each for all. His son Chester and three daughters, Ella, Lucy and Frances, were as children the frequent companions of his pedestrian trips, and later, in addition to their own chosen pursuits, assisted him in his Academy work. As was truly said of him at the time of his death, "Davenport has never known a man of gentler, kindlier manner, more even temper, sweeter disposition, purer aims and affections or more upright life." Not at all a man of affairs, he yet made much more of life than is to be found in mere financial success. Industrious, careful and methodical to a marked degree, he accomplished a great deal of work, much of which will long remain in evidence in the Academy's various collections. His portrait, placed as frontispiece to this volume, will awaken loving remembrance in the hearts of all who are left of his old associates and friends.

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A GLIMPSE INTO OUR FUTURE.

BY W. H. PRATT.

READ BEFORE THE ACADEMY JUNE 13, 1890.*

Friends of the Academy and of Education and Progress:

I have proposed "A Glimpse into our Future" with no pretence to prophecy but merely to point to what all can surely see as well as I and to take the opportunity of offering some suggestions in connection therewith.

Often while occupied in this building in looking backward in the contemplation and earnest study of the relics of the past of humanity on this continent, relics dating back to the glacial period or earlier, the curious and meager evidences and representations of nearly the very dawn of civilization in America, we are, on turning to the present, almost startled at the contrast between the "Stone Age" and this.

Here on the same soil trodden by those our remote predecessors; occupying the same hills and valleys; dwelling in houses where theirs stood; sitting where they sat and viewing the mighty river rolling at our feet as at theirs, we suddenly realize that, though in the same, we are almost living in a new world; that we are entering, or have already entered, upon the bright "Age of Electricity," full of possibilities and, indeed, of certainties of further advances and developments altogether inconceivable at our present point of view.

What an immense stretch of human progress attained by courage, effort, skill and endurance, by suffering, sacrifice and irrepressible ambition is comprehended in this great change!

Fascinating as it is, we cannot stop now to trace it step by step. The new development has burst upon us in almost dazzling brilliancy and with startling suddenness and rapidity.

The time was ripe for it, an epoch-marking activity prevailing all over the scientific world; and while still in the transition state from

*This paper was not meant for publication except by the local press, but it seems appropriate that it should now be given, in connection with its author's portrait and biographical sketch, as a last earnest word for the institution to which his life was devoted.

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the ways of the past to those of the future — from the 19th century to the 20th — a rapid transformation, unparalleled in the world's history, is already accomplished. Looking back only so far as the short history of this Academy association, and contrasting the methods in daily life then and now, the change is amazing. Look back fifty years, and those whose memory does not reach so far are scarcely able to comprehend the ways of that, their grand-parents', time. Today the progress of change is even more rapid than ever before. One cannot look out for ten minutes from the door of this building without seeing many evidences of this and feeling that even ourselves are being —or are at least in immediate danger of being—left behind.

It is to this point especially that I desire to call attention, and such is the object of these remarks.

In expectation of leaving the city after a residence of fully one-third of a century here, one-half of a busy life, and a large portion of this time in the Academy,— a work I preferred to any other,— I cannot but feel regret. I should be glad if I could find a way to present to the members and in general, also, to the wide-awake, thoughtful and public-spirited portion of our community, one question for their thoughtful consideration which I will formulate by and by.

I do not like to do this without offering, also, some suggestions upon the situation, the needs and possibilities, as well as the true interests of the people as seen from my standpoint. First allow me, then, a brief review.

It is now over twenty-two years since the first actual move was made to organize the Davenport Academy of Natural Sciences, and the scientific work was begun in a very small and unpretentious way, but increased until it attracted attention and the Academy was everywhere recognized as one of the very few really active scientific societies in this country. It was commenced without any funds whatever and has always had to contend against the difficulty of want of means to prosecute its work to the best advantage.

Some noble acts for its establishment and support are on record. Without them it could not have survived. Some earnest and successful efforts to relieve it from difficulties and hindrances have been made, but these (except the gift of the lot and erection of the building) were but temporary. It all did not provide a *permanent* establishment, did not obviate the necessity for further and continued provision and support.

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It is an institution in which our citizens feel a just pride and on account of which they have been much credited for intelligence and liberality in maintaining it — one which has enlisted the earnest, persistent and self-sacrificing labors of noble workers now gone from us and whose places are not filled. With every dollar expended has been applied much more in cheerful, hopeful labor for the cause the institution represents — *scientific education.*

The annual subscription for five years to meet current expenses and keep the work going on — which was a noble act but nevertheless only a temporary expedient never intended to be continued indefinitely — a subscription which has sufficed to meet a portion of the small expenditures, expires with next year.

The present arrangement for the daily routine work, even if it were at all adequate—which it is not—could not in the inevitable order of human events continue more than a comparatively short period.

Now it certainly can never be that an institution directly connected with the highest public educational interests can be long dependent upon the presence of any one person, or two, or three, for its successful guidance and support. Attention to the matter should not be too long delayed and provision should be made to meet these changes before the dwindling process has gone too far. If the Academy is to be sustained, a new departure, financially, is absolutely necessary. It must be placed on a solid foundation. It cannot always live "from hand to mouth" and do good work. The constant attitude of a beggar tends to inspire contempt.

The institution is fully worthy of an independent position, and to place it so should be the care of our citizens.

It may be said that somebody has already furnished considerable money to build up and support the Academy. This is true, and upon a careful examination of the records I can present the following approximate statement of the moneys received from the community during the whole twenty-two years:

Regular members' fees and dues	$ 5,325 00
Net proceeds of lectures	325 00
Net proceeds of entertainments	1,950 00
Total patronage	7,600 00
Cash contributions, including life memberships	11,000 00
	$18,600 00

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For the $7,600 the patrons have had in return the usual privileges of membership, for which the fees paid were not exorbitant—were, in fact, unusually light. For the $11,000 contributed it is certainly not extravagant to assume that it has been fully returned to the public by the effect of the reputation it has given the city for appreciation and support of scientific progress; and it should not be forgotten that a very considerable portion of this amount has been contributed by the active members themselves and about $1,000 of it has come from distant friends.

Today the actual money value of the building and contents (the latter very difficult to estimate), i.e., library, natural history and archæological collections, cases, etc., is probably scarcely short of $100,000. The real estate is worth fully $8,000. The value of the collection of archæological relics is immensely increased by the fact that, while it far excels any other of its kind and represents this mound district very perfectly, the opportunity for making such collections in this region is past.

The whole, by its articles of incorporation, is entirely under the management of the regular and life members.

It has a permanent fund at interest, now amounting to $1,200. The indebtedness is something less than $800 and there is no incumbrance on the property. Like all scientific organizations, the Academy is in no way a money-making institution — could not be in the nature of the case, as the two objects are wholly incompatible; but economy is nevertheless absolutely essential to success. None can be more thoroughly aware of this essential than the competent and prudent persons who have had direction of the financial proceedings and management of the funds. A familiarity with the conduct of its affairs or examination of the records proves that there has been no extravagance, no careless, wasteful or misapplied expenditures. All the means furnished have been applied as economically as possible to the legitimate work of such an organization.

Exchanges and contributions to library and museum are coming in as heretofore, but the *work* is gradually diminishing as the years go by. Workers drop off and means to employ help are wanting.

The financial methods of the past, while the proper and only possible methods under the circumstances, were necessarily such as are adapted only to years of infancy. The Academy has now reached its majority and should take its position among the established institutions

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of the city and the state. An enduring scientific institution must be on a broader and more reliable basis, not dependent for its support upon occasional expedients and spasmodic efforts, but on a more comprehensive plan, equipped to accomplish more of value to the community. On this point I would offer a few suggestions toward an outline of the Davenport Academy of Natural Sciences of the future, in and for and worthy of the twentieth century upon which we are so soon to enter, and of the progressive city of its birth and growth.

First, as to *what it should do.*

It is, I believe, a recognized principle that educational work — instruction for the people — is and must be the real foundation of all successful scientific institutions. To conform to this principle, to come as near to the *people* as possible, and to be of value to the cause of true education, a prominent feature of its work must consist in class instruction, viz.: classes from the public schools, day classes of other persons, evening classes of adults. The subjects of lessons would embrace zoölogy and its subdivisions, botany and forestry, physiology and hygiene, physical geography and meteorolcgy, geology and palæontology, chemistry, physics, technical drawing, and such other scientific branches as may be found practical and desirable; also explorations and collections, original scientific research and experiment, scientific papers (original), lectures by faculty, members and others, *conversaziones* for free discussion; entertainments and excursions; publications (established and regular); library (pamphlets and paper-covered volumes should be bound) and a complete subject catalogue made and kept always up to the time, to make the great amount of scientific, statistical and historical matter here gathered available to the public. The occasional purchase of a volume of especial importance, not obtainable by exchange, would add greatly to the value of the library. The community would ere long become aware of its rich accumulations and avail itself of it, and thus their interest in the institution and its support would be increased. On these several points I will particularize a little so as not to be misunderstood.

As to *class instruction:* The experiment already made, and extending nearly a year and a half, of bringing the pupils of the public schools directly into the Academy rooms for systematic scientific instruction, illustrated by ample collections of specimens for their close inspection in connection with the lesson, a plan which originated with the Davenport Academy, has already been amply sufficient

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to demonstrate the feasibility, usefulness and popularity of this method. It has, moreover, become plain that the same might be advantageously extended to one or two lower grades, and all to come oftener, — say once in each month. There might then be two or three lessons upon the same subject. The influence of this work would soon appear in the schools. Teachers tell me it has already done so. The obvious advantage of this method is that it makes possible a much more complete illustration with the actual objects than could be made by means of such collections as could be found at each school.

The other classes mentioned would not be expected to be kept up constantly, but according to the demand, a course from time to time in either branch as desired, a moderate fee being charged. In addition to the faculty, which would be small, members or other persons of special ability could always be found to give the lessons, receiving as compensation the fee paid by the pupils, or a portion of it, thus making these lessons largely self-supporting. This arrangement would meet a very decided want in this community and would be increasingly appreciated and patronized.

In *explorations and collections* the chief object should be not merely to enlarge the collections, but rather to secure additional types and forms in archæology and anthropology, to complete series of all local natural history departments and systematic series in the various other branches, and to gather—where it can be done without much expense —material desirable for exchange.

Original Research. This would consist principally of exhaustive study of the collections in hand and of local natural history subjects, though not necessarily confined within those limits. New discoveries are always desirable.

Scientific papers would be chiefly results of these researches, to be read at Academy meetings and published in its Proceedings or memoirs.

Lectures. These might include a wide range of subjects of popular interest, not strictly scientific in the ordinary sense, and should tend not only to develop local talent and interest, but to bring noted persons of the scientific world among us occasionally to give a fresh stimulus to scientific study, reading and observation. The greatest benefit would be derived from lectures by making them instructive and popular rather than profitable pecuniarily.

Conversaziones or Symposia. In the early days of the Academy we found these occasional meetings for the discussion of subjects of inter-

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est—practical, theoretical or speculative—to be enlivening and agreeable and to promote sociability and prevent stagnation.

Entertainments. Such of these as might be given should, perhaps, usually be in connection with some scientific or historical exhibit, dramatic or otherwise, and should include occasional excursions.

Publications. Maintaining our connection and intercourse with the scientific world by the distribution of our reports of proceedings with much more regularity than heretofore, should be a matter of more careful attention and prominence, be better supported than it has been, and should not be left as a burden to be borne almost wholly by one devoted individual. As soon as it should become established as a regular issue, the subscription to volumes and sale of special papers published would meet the whole expense of publication. Upon this mainly depends the building up of the library, the necessities of which I have already referred to.

Now, all this absolutely necessitates enlarged space for collections, meetings and work. This need must be squarely met by the provision of a building fund to be expended in the erection of, substantially, the larger portion of the structure originally designed twenty-three years ago; also, in rendering the whole more secure against fire and burglary and in so improving the present basement as to render it dry and suitable for occupancy, having in it, for example, a laboratory and aquarium. The new building, 45x75 feet inside, will afford an audience room ample for meetings, public lectures and entertainments. The museum, being in that part, would have more space—45 x 75—with two galleries all around and lighted from the roof. The library, occuping the present museum room and cases (as originally intended) would also have greatly extended shelf and reading room, with the books enclosed against dust, loss and injury. A fund of $15,000, it is believed, would meet this demand and erect a building sufficient and suitable and one of which citizens would not be ashamed.

To carry out the plan of work as suggested there would be required a competent professor of natural sciences at a salary of say $1,500, and a curator for say $600. This would require an endowment fund of perhaps $25,000. There must be a library fund of say $5,000 and a publication fund of say $5,000, making a permanent fund of $35,000 of which the interest only could be used. This, with the building fund of $15,000, would call for an aggregate of $50,000. (Membership fees and dues, admission fees, etc., would probably meet the current minor expenses).

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Does some one say, "Fifty thousand dollars is a good deal of money?" That depends upon the nature of the object to be secured by it. It is not an extravagant sum to expend in equipping a permanent and valuable institution of public benefit. To appropriate some of the surplus capital not in use in business to such a purpose is not giving it away: it is keeping it here invested for your own and your children's benefit. It is but transferring some dollars from one kind of work to another more active, and instead of lying there simply drawing interest for the owner, making them of benefit to the public, including himself and his posterity. It is by no means a chimerical scheme, but thoroughly practical and practicable.

When, not long ago, the plan was proposed of establishing an endowment fund for the especial purpose of securing the constant services of an efficient manager and instructor in natural science, the first citizen who was consulted offered at once to start a subscription with $1,000 for the purpose. Surely, there must be more such men. And given a good, sound, well-considered plan, we may find that the ladies, who have already borne so noble a part in furnishing the means, the talent and the persistent labor, have not exhausted their interest or their resources and are not the only women who possess the appreciation, spirit and ability to aid in establishing a good work. For encouragement in this, note the fact that ladies of Boston and vicinity took up the work, when otherwise it seemed hopeless, of raising the large fund required for securing, preserving and properly arranging and beautifying the Great Serpent Mound and grounds, situated in Ohio. See also the Elizabeth Thompson Fund to aid in worthy scientific work of societies not possessing ample means for large expenditures. Again, there are several non-resident friends, a number of them large owners of Davenport property, and some of them former residents of the city, whose names appear on our records as contributors of several hundreds each toward this building and the publication of the Academy Proceedings and to the general fund. These would doubtless aid the proposed movement with their characteristic and far-seeing liberality; and other such persons, having an interest in scientific educational progress, would join them in it, as the establishment of a permanent fund would naturally commend itself to their judgment as the wisest course.

Further, it is understood that not long since certain bequests were provided, or were in contemplation, for the especial object of the

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future maintenance and support of competent scientific instruction in the Academy. This is perhaps contingent upon a reasonable assurance of the permanency of the organization and the actual establishment of the fund would be followed by its enlargement by such occasional bequests. Still some other possible—perhaps not quite improbable—sources of aid and support there might be if once the ball were set rolling, as, for example, specific appropriations by city, county or state, and from the public school fund for regular instruction of school classes. Thus we may see that the sources from which help would come toward the accomplishment of the work when fairly entered upon, are probably much more various and numerous than usually occurs to persons at first thought upon the subject.

As to method of personal contributions: Subscriptions might very properly be made, if persons see fit to do so, in the form of life membership fees—$100 each—any number of them, making life members of such individuals as the subscriber might designate, and to be accepted by the Academy on the election of such persons as members, each of whom would then have an equal voice in the management of the affairs of the institution. An important point, in my opinion, is that, if possible, subscriptions to such fund, and these life memberships, should not be made conditional upon the whole proposed sum, or any fixed amount being subscribed before they should become payable. This condition involves so much delay that it would be very much better if the subscriptions should be paid in, put at interest at once, and the work started up as fast as the interest becomes available. The increased activity would afford encouragement, awaken interest and help in securing funds. And yet those who preferred to do so, if any there were, might still make conditional subscriptions.

The opportunity is a grand one. In what small city, I ask, is it equaled? Look at it!

There is already accumulated here, as a foundation, collections not only of priceless worth scientifically, but of cash value much beyond the amount now required to establish it permanently here, occupying a building and beautiful lot owned by the Association. The Academy is a Davenport institution known far and wide, through which our city has become known among the cultured circles in nearly every part of the world, gaining a reputation of great value which should not be forfeited. Moreover, it is already and has long been *at work*.

Though cramped by want of sufficient means and working force,

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its work has not ceased; it is going on continuously and successfully; it has not to be begun as an uncertain experiment; the way is well marked out with an experience of over twenty years and has but to be continued, improved, strengthened, expanded by more means and appliances. The most difficult point has been passed.

A city is known by its institutions and its treatment of them.

Let the opportunity pass—let the needed support be withheld and the work starved out, as it will be unless efficient action is taken—and an equally favorable combination of conditions is scarcely to be hoped for at any future time. The institution and its work and progress may easily be maintained and a fresh impetus imparted. To resuscitate it if allowed to lapse might be well-nigh impracticable.

Thus, then, comes the question to be considered by this community, viz.: Shall an Academy of Natural Sciences be maintained in Davenport? It still remains to be answered by the action of the prosperous and well-to-do people of this flourishing city. The past twenty-two and a half years have seen the inception, building up and carrying on of the work thus far, but have not furnished a final answer to the above question.

Is it not worth $50,000 to establish such an institution, on a permanent foundation, to maintain and increase the reputation of the city for educational spirit and advantages, rather than to let it go down or go away — to lose the future benefit of the great amount of work already done here and allow some other city to take the lead in this regard? Can you, citizens, afford it?

With the unmistakable indications of a renewed activity and continued progress; with a freer avenue of communication and commercial intercourse with the world soon to be opened by the Hennepin canal at our doors; with the increasing importance of the government arsenal; with the utilization of the immense Rapids water-power, certain to come in the near future; and when, about the beginning of the coming twentieth century, the census returns shall show Davenport with fifty thousand citizens, shall the city still contain an Academy of Natural Sciences, grown with its growth, ranking among the three or four most active American scientific societies and bearing an important part in the educational facilities of the city?

Or, on the contrary, shall we, citizens, let it go to some other locality, there to continue its work and growth? The choice must be made. Die it cannot. It has accomplished too much, has too much

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value, too much vitality and too many friends to become extinct or to lose its identity and independent existence by absorption by some wealthier association. That, at least, must not be.

There is no lack of means in Davenport, means which could be spared to secure the permanent location and maintenance of many such institutions of importance to the culture, welfare and educational progress of this community, without encroaching upon the capital employed in active business enterprise. Will it not pay to provide for this? Will it not help to attract hither the best class of citizens, and hence to advance other lines of public improvement? Will not failure to support it be discreditable and a lasting reproach? It is time that the matter should be canvassed. Let it be no longer ignored by those who are actively interested not only in prosperity for the sake of profit, but also for the true interests of humanity. Let the responsibility of representative and influential citizens be recognized. Let discussion be had, suggestions presented and the matter, instead of going by default, be finally determined according to the rank and place which our intelligent and public-spirited people intend our city to hold in the future.

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PROCEEDINGS

OF THE

DAVENPORT ACADEMY

OF

NATURAL SCIENCES.

VOLUME VIII

CATALOGUE OF THE DESCRIBED ORTHOPTERA OF THE UNITED STATES AND CANADA.

BY SAMUEL H. SCUDDER.

Ever since the publication of my "Catalogue of the Orthoptera of North America described previous to 1867" *(Washington, Smithsonian Institution, 1868, 8°), I have kept the same up to date, on slips as a "card catalogue," and the number of entries is now immensely greater than then. This list I hope to publish when the century has closed, so as to have it include all forms described or treated during the eighteenth and nineteenth centuries; like the last it will be an Index to the species, not a Systematic Catalogue of them, though containing the material for such a work.

This manuscript material I have used in compiling the present catalogue, which is the first attempt at a complete synonymic list which has been made. It is confined to the United States and Canada, and is believed to include every species which has been described as coming from that territory (excepting some of Walker's), each referred as far as possible to the proper genus. The generic vicissitudes of the

* This should have been entitled "Index" and not "Catalogue," and was so given in my manuscript.

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proper specific name of each species is indicated by references to first use under each, but of the synonyms, only the originally designated generic name is quoted. When no generic name is appended to a reference, it is to be understood that the species is there referred to the same genus as in the present catalogue.

The list is arranged in systematic order as far as the species, but these are given alphabetically, for in the large genera at least they are thus more readily found, while an alphabetical index to the accepted genera will be found at the end. Brief general indication of geographical range within (but not outside) the limits of our territory follows each species. Varieties are not considered.

In a few cases, where genera have been recognized as found within our territory but the species of which are undescribed, descriptions of the species have been added in an Appendix, and by the liberality of the Academy most of these are figured.

The present catalogue contains the names of 856 species,* divided among the families as follows: Forficulidae, 14; Blattidae, 32; Mantidae, 17; Phasmidae, 11; Acridiidae, 524; Locustidae, 194; Gryllidae, 64. In some genera no doubt the number of described species will be reduced by a critical study, but in nearly all such cases it is highly probable that other still undescribed species already exist in our collections.

The completion of this catalogue renders possible for the first time a numerical comparison between the Orthoptera of Europe and North America north of Mexico. Taking Brunner's Prodromus der europäischen Orthopteren as a representation of the European fauna, the following table will show the relative number of species in the different families in Europe and North America:

FAMILIES.	UNITED STATES.	EUROPE.
Gryllidae	64	33
Locustidae	194	214
Acridiidae	524	148
Phasmidae	11	4
Mantidae	17	13
Blattidae	32	23
Forficulidae	14	26
Totals	856	461

*A few additions have been made to the Catalogue since this count was made, but too few materially to affect the figures and proportions given here and beyond.

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Or, reducing these numbers to percentages, the result may be thus shown:

FAMILIES.	UNITED STATES.	EUROPE.
Gryllidae	7.5	7.2
Locustidae	22.7	46.4
Acridiidae	61.2	32.1
Phasmidae	1.3	0.9
Mantidae	2.	2.8
Blattidae	3.7	5.
Forficulidae	1.6	5.5

These tables show that the greatest contrast appears in the Acridiidae, and we may give a further analysis of this difference in the following table:

SUB-FAMILIES.	ACTUAL NUMBERS.		PERCENTAGES.	
	U. S.	EUROPE.	U. S.	EUROPE.
Tettiginae	38	6	7.3	4.1
Mastacinae	1	0	0.2	0.
Tryxalinae	90	57	17.2	38.5
Oedipodinae	154	32	29.4	21.6
Pyrgomorphinae	0	2	0.	1.4
Pamphaginae	0	34	0.	23.
Acridiinae	241	17	46.	11 5
Totals	524	148	100.1	100.1

This shows clearly that Europe is peculiar for its Pamphaginae and America for its great preponderance of Acridiinae and next of Oedipodinae. The American preponderances are largely due to the vast development of Melanopli and in a lesser degree of such Oedipodine genera as Hippiscus, Trimerotropis, Arphia, Circotettix and Mestobregma.

In the Gryllidae, America is peculiar for its Eneopterinae (7 sp.), unknown in Europe, and in the Locustidae for its large development of Stenopelmatinae, 77 species against 5 in Europe (largely due to its Ceuthophili) and of Conocephalinae, 48 species against 6 in Europe; while in the same family Europe has a rich representation of Ephippigerinae (53 sp.), wholly wanting in America, and several sub-families — Meconeminae (3 sp.), Saginae (2 sp.), Locustinae (6 sp.), Callimeninae (4 sp.), and Hetrodinae (6 sp.), all also unrepresented in America. Other sub-families found in Europe and not in America are Pyrgomorphinae, 2 sp. (Acridiidae), Empusinae, 3 sp. (Mantidae), and

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Ectobinae, 17 sp. (Blattidae); while other sub-families represented in America and not in Europe are Pseudophyllinae, 2 sp., and Gryllacrinae, 1 sp. (Locustidae), Mastacinae, 1 sp. (Acridiidae), Bacunculinae, 5 sp., and Anisomorphinae, 4 sp. (Phasmidae), and Nyctoborinae, 2 sp., Panchlorinae, 2 sp., Oxyhyaloinae, 1 sp., and Panesthinae, 1 sp. (Blattidae).

Only 26 of the 108 genera of European Orthoptera are recognized in the United States and half of these are cosmopolitan. The number of American genera is 205.

In 1897 I published a "Guide to the Genera and Classification of the North American Orthoptera found north of Mexico" (Cambridge, E. W. Wheeler, 8vo.). The present work is a companion to that, and by the aid of the two it should now be found possible for everyone having a fair access to the literature to study and arrange his own collections with comparative ease. This has not hitherto been the case, and I trust that these works may stimulate the study of our Orthoptera, which are as yet very imperfectly known.

Cambridge, Mass., September 30, 1899.

CATALOGUE OF THE ORTHOPTERA OF THE UNITED STATES AND CANADA.

FORFICULIDAE.

LABIDURA Leach.

riparia Pall., Reise, ii, anh., 30 (1773)—Forficula.
Dohrn, Stett. ent. zeit., xxiv, 313-316 (1863).
pallipes Fabr., Syst. ent., 270 (1775)—Forficula.
? *dentata* Fabr., Ibid., 270 (1775)—Forficula.
gigantea Fabr., Mant. ins., i, 224 (1787)—Forficula.
bilinata Herbst, Fuessl. Arch. ins., vii–viii, 183, pl. 49, fig. 1 (1788)—Forficula.
maxima Vill., Linn. ent., i, 427, pl. 2, fig. 53 (1789)—Forficula.
bidens Oliv., Encycl. méth., vi, ii, 466–467 (1792)—Forficula.
crenata Oliv., Ibid., vi, ii, 467 (1792)—Forficula.
erythrocephala Fabr., Ent. syst., ii, 4 (1793)—Forficula.
? *flavipes* Fabr., Ibid., ii, 2–3 (1793)—Forficula.
morbida Serv., Ann. sc. nat., xxii, 35 (1831)—Psalis.

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bivittata Klug, Burm., Handb. ent., ii, 751-752 (1839)—Forficula (Forficesila).

suturalis Burm., Ibid., ii, 752 (1839)—Forficula (Forficesila).

? *bicolor* Fisch. Wald., Ent. russ , iv, 42 (1846)—Forficula.

fischeri Motsch., Fisch. Wald., Ibid., iv, 354 (1846)—Forficula.

affinis Guér., Sagra, Hist. phys. Cuba, An. art., 330-332, pl. 12, figs. 2, 2a (1857)—Forficula (Forficesila).

xanthopus Stål, Ofv. vet. akad. förh., xii, 348-349 (1855)—Forficesila).

amurensis Motsch., Bull. soc. nat. Mosc. xxxii, ii, 499 (1859)—Forficula.

Introduced: Gulf Coast.

ANISOLABIS Fieber.

maritima Bon., Géné, Monogr. Forf., 9-10 (1832)—Forficula.
Serv., Orth., 27-28 (1839)—Forficesila.
De Haan, Verh. nat. gesch. Ned. bezitt., Orth., 240 (1842)—Forficula (Forficesila).
Fieb., Lotos, iii, 257 (1853).
Fisch., Orth. Eur., 68, pl. 6, fig. 4, 4a-d (1853)—Forficula (Labidura).
Dohrn, Stett. ent. zeit., xxiii, 226 (1872)—Forcinella.
Dohrn, Ibid., xxv, 293-294 (1874)—Brachylabis.

alipes Mus. Berol., teste Fieb., Lotos, iii, 257 (1853)—Forficula.

?*japonicus* Hag., Proc. Bost. soc. nat. hist., xi, 399-400, fig.; xii, 139 (1868)—Hodotermes.

Introduced: Seaboard from New York to New Orleans..

SPONGOPHORA Serville.

brunneipennis Serv., Orth., 30-31 (1839)—Psalidophora.
Scudd., Proc. Bost. soc. nat. hist., xviii, 330 (1876).

New Jersey to Nebraska, Texas and Arizona.

FORFICULA Linné.

aculeata Scudd., Proc. Bost. soc. nat. hist., xviii, 262-263 (1876).

Northern U. S. east of Mississippi River.

auricularia Linn., Syst. nat., ed. x, i, 423 (1758).

cyclolabia Schmidt, Verz. Krain Orth., 77 (186–).

macrolabia Schmidt, Ibid., 78 (186–).

major De Geer, Mém., iii, 545-552, pl. 25, fig. 16-25 (1773).

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FORFICULA (Continued).

parallela Fabr., Syst. ent., 270 (1775.)
media Marsh., Col. Brit., ii, 530 (1802).
neglecta Marsh., Ibid., ii, 529-530 (1802).
infumata Mühlf., Charp., Hor. ent., 70 (1825).
borealis Leach, Steph., Ill. brit. ent., Mand., vi, 5-6, pl. 28, fig. 3 (1835).
forcipata Steph., Ibid., vi, 6, pl. 28, fig. 4 (1835).
lurida Fisch., Orth. Eur., 75-76, pl. 6, fig. 12a-b (1853).
Introduced: New York, New Jersey.

exilis Scudd., Proc. Bost. soc. nat. hist., xviii, 262 (1876).
Texas.

percheroni Guér.-Perch., Gen. ins., vi, 4, pl. 7 (1835-1838).
elegans Klug, Burm., Handb. ent., ii, 753 (1839).
bipunctata Scudd., Bost. journ. nat. hist., vii, 415 (1862)—Sphongophora.
Massachusetts (accidental?).

pulchella Serv., Orth , 42 (1839).
New York.

SPHINGOLABIS Bormans.

californica Dohrn, Stett. ent. zeit., xxvi, 85-86 (1865)—Forficula.
Borm., Biol. centr. amer., Orth., 12, pl. 2, fig. 20 (1893).
California.

taeniata Dohrn, Stett. ent. zeit, xxiii, 230 (1862)—Forficula.
Borm., Biol. centr. amer., Orth., 12, pl. 2, figs. 17-19 (1893).
Texas to Oregon and California.

LABIA Leach.

burgessi Scudd., Proc. Bost. soc. nat. hist., xviii, 266-267 (1876).
Florida.

guttata Scudd., Proc. Bost. soc. nat. hist., xviii, 265-266 (1876).
Texas to Florida.

melancholica Scudd., Proc. Bost. soc. nat. hist., xviii, 267-268 (1876).
Texas.

minor Linn., Syst. nat., ed. x, i, 423 (1758)—Forficula.
Leach, Edinb. encycl., am. ed., viii, 707 (1816).
Fieb., Lotos, iii, 257-258 (1853)—Copiscelis.
Friv., Orth. Hung., 46-47 (1867)—Forficesila.

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?*livida* Zschach, Mus. Lesk., 46 (1788)—Forficula.
minuta Scudd., Bost. journ. nat. hist., vii, 415-416 (1862).
Europe. U. S. and Canada east of Rocky Mts.

BLATTIDAE.

BLATTINAE.

THYRSOCERA Burmeister.

cincta Burm., Handb. ent., ii, 499 (1839).
mexicana Sauss., Rev. mag. zool, 1862, 168 (1862).
sallei Sauss., Ibid., 1862, 168 (1862).
Texas.

ISCHNOPTERA Burmeister.

bolliana Sauss.-Zehntn., Biol. centr. amer., Orth., 40 (1893).
Texas, New Mexico.

borealis Brunn., Blatt., 133 (1865).
Nebraska to Minnesota.

consobrina Sauss., Orth. Amér. moy., 88 (1864).
occidentalis Sauss., Ibid., 87 (1864).
Texas, Louisiana.

couloniana Sauss., Rev. mag. zool., 1862, 169 (1862).
lata Brunn., Blatt., 135 (1865).
Texas.

divisa Sauss.-Zehntn., Biol. centr. amer., Orth., 40 (1893).
Georgia.

hyalina Scudd., Trans. amer. ent. soc., ii, 307 (1869).
Delaware.

inaequalis Sauss.-Zehntn., Biol. centr. amer., Orth., 36, pl. 6, figs. 14-17 (1893).
Texas.

nigricollis Walk., Cat. Blatt. Brit. mus. 118 (1868).
Georgia.

pennsylvanica De Geer, Mém., iii, 537, pl. 44, fig. 4 (1773)—Blatta.
Scudd., Bost. journ. nat. hist., vii, 417 (1862)—Platamodes.
Sauss., Orth. Amér. moy., 84 (1864).
nortoniana Sauss., Rev. mag. zool., 1862, 169 (1862).
Northern U. S. and Canada, east of Rocky Mts.

uhleriana Sauss., Rev. mag. zool., 1862, 169 (1862).
Pennsylvania and Georgia to New Mexico.

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unicolor Scudd., Bost. journ. nat. hist., vii, 417 (1862)—Platamodes. Brunn., Blatt., 134 (1865).
lithophila Scudd., Bost. journ. nat. hist., vii, 418 (1862)—Ectobia.
U. S. east of great Plains.

BLATTA Linné.

germanica Linn., Syst. nat., ed. xii, ii, 688 (1767).
Westw., Intr. class. ins., i, 515, fig. 51 (1838)—Ectobia.
Serv., Orth., 107 (1839)—Phyllodromia.
?*asiatica* Pall., Reise, iii, 263 (1776).
bivittata Serv., Orth., 108-109 (1839)—Blatta (Phyllodromia).
Thom., Proc. Dav. acad. nat. sc., i, 250, pl. 36, figs. 1, 2 (1876)—Ischnoptera.
Introduced: Everywhere.

PHYLLODROMIA Serville.

borealis Sauss., Rev. mag. zool., 1862, 166 (1862)—Blatta.
Brunn., Blatt., 101 (1865).
Brunn., Ibid., 413 (1865)—Ectobia.
Sauss., Miss. scient. Mex., zool., vi, 42 (1870)—Blatta (Phyllodromia).
marginata Scudd., Rep. U. S. geol. surv. Nebr., 251 (1871)—Temnopteryx.
New York, New Jersey, Nebraska.

CERATINOPTERA Brunner.

lutea Sauss.-Zehntn., Biol. centr. amer., Orth., 48-49 (1893).
Gulf States.

TEMNOPTERYX Brunner.

major Sauss.-Zehntn., Biol. centr. amer., Orth., 54 (1893).
Tennessee.

texensis Sauss.-Zehntn., Biol. centr. amer., Orth., 52, pl. 3, fig. 31 (1893).
Texas, New Mexico.

virginica Brunn., Blatt., 86 (1865).
New York and Virginia to Nebraska.

LOBOPTERA Brunner.

americana Scudd. (See Appendix.)
Arizona.

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NYCTOBORINAE.

NYCTOBORA Burmeister.

holosericea Klug, Burm., Handb. ent., ii, 502 (1839).
New York, Minnesota.

mexicana Sauss., Rev. mag. zool., 1862, 227 (1862).
Nebraska.

sericea Burm., Handb. ent., ii, 501 (1838).
aegyptiaca Drury (nec Linn.), Ill., ii, 71, pl. 36, fig. 3 (1773)—Blatta.
druryi Serv., Orth., 86 (1839)—Blatta.
Introduced: Massachusetts.

PERIPLANETINAE.

EURYCOTIS Stål.

ingens Scudd., Proc. Bost. soc. nat. hist., xix, 92 (1877)—Platyzosteria.
Scudd., Psyche, ii, 154 (1878).
Florida.

sabaliana Scudd., Proc. soc. nat. hist., xix, 93 (1877)—Platyzosteria.
Florida.

PELMATOSILPHA Dohrn.

rotundata Scudd. (See Appendix.)
Texas.

STYLOPYGA Fischer de Waldheim.

orientalis Linn., Syst. nat., ed. x, i, 434 (1758)—Blatta.
Burm., Handb. ent., ii, 504 (1839)—Periplaneta.
Serv., Orth., 72 (1839)—Kakkerlac.
Blanch., Hist. nat. ins., iii, 6 (1840)—Blatta (Kakkerlac).
Fisch. Wald., Orth. russ., 70, pl. 24, fig. 1, 2 (1846-1849).
Sauss., Orth. Amér. moy., 73 (1864)—Periplaneta (Stylopyga).
Caulf., Rep. ent. soc. Ont., xviii, 68 (1886)—Blatta (Stylopyga).
culinaris DeGeer, Mém., iii, 344, pl 25, figs. 1-7 (1773)—Blatta.
Cosmopolitan, especially by seaboard.

PERIPLANETA Burmeister.

americana Linn., Syst. nat., ed. x, i, 434 (1758)—Blatta.
Serv., Ann. sc. nat., xx, 39 (1831)—Kakkerlac.
Burm., Handb. ent., ii, 503 (1838).
Blanch., Hist. nat. ins., iii, 6 (1840)—Blatta (Kakkerlac).

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PERIPLANETA (Continued).

Guér., Sagra, Hist. nat. Cuba, 339 (1859)—Blatta (Periplaneta).
Sauss., Orth. Amér. moy., 71 (1864)—Periplaneta (Cacerlaca).
lata Herbst, Fuessl. Arch., iv, 185, pl. 54, fig. 5 (1786)—Blatta.
kakerlac Oliv., Encycl. méth., 315 (1789)—Blatta.
siccifolia Stoll', Repr. Blattes, pl. 3d, fig. 10, 11 (1813)—Blatta.
aurantiaca Stoll', Ibid., pl. 3d, fig. 14 (1813)—Blatta.
brunnea Klug, Burm., Handb. ent, ii, 503 (1838).
Cosmopolitan.

australasiae Fabr., Syst. ent., 271 (1775)—Blatta.
Burm., Handb. ent., ii, 503 (1838).
Guér., Sagra, Hist. nat. Cuba, 340 (1857)—Blatta (Periplaneta).
Sauss., Orth. Amér. moy., 72 (1864)—Periplaneta (Cacerlaca).
domingensis Palis., Ins. Afr. Amér., 182, pl. 1b, fig. 4 (1818)—Blatta.
zonata Hagenb., Haan, Bijdr. kenn. Orth., 49 (1842).
Florida, Nebraska, Minnesota.

PANCHLORINAE.

PANCHLORA Burmeister.

poeyi Sauss., Rev. mag. zool., 1862, 230 (1862).
nivea Herbst (nec Linn.), Fuessl., Arch., 1786, 185, pl. 49, fig. 8 (1786)—Blatta.
viridis Burm. (nec Fabr.), Handb. ent., ii, 506 (1838).
Atlantic Coast.

PYCNOSCELUS Scudder.

surinamensis Linn., Syst. nat., ed. xii, 687 (1767)—Blatta.
Burm., Handb. ent., ii, 507 (1838)—Panchlora.
Guér., Sagra, Hist. nat. Cuba, 342 (1857)—Blatta (Panchlora).
Brunn., Blatt., 278-280, pl. 7, fig. 32 (1865)—Panchlora (Leucophaea).
Brunn.-Redt., Proc. zool. soc. Lond., 1892, 205 (1892)—Leucophaea.
indica Fabr., Ent. syst., ii, 8 (1792)—Blatta.
melanocephala Stoll', Repr. Blattes, pl. 4d, fig. 20 (1813)—Blatta.
? *corticum* Serv., Orth., 90 (1839)—Blatta.
obscurus Scudd., Bost. journ. nat. hist., vii, 424 (1862).
Gulf and southern Atlantic States.

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CORYDINAE.

HOMOEOGAMIA Burmeister.

bolliana Sauss., Rev. suisse zool., i, 296 (1893).
Texas, New Mexico.

PLECTOPTERINAE.

CHORISONEURA Brunner.

texensis Biol. centr. amer., Orth., 80 (1893).
Texas, New Mexico.

PERISPHAERINAE.

HORMETICA Burmeister.

advena Scudd. (See Appendix.)
Introduced: Massachusetts.

PANESTHINAE.

CRYPTOCERCUS Scudder.

punctulatus Scudd., Bost. journ. nat. hist., vii, 420 (1862).
Brunn., Blatt., 389 (1865)—Dasyposoma.
Virginia, California.

MANTIDAE.

MANTINAE.

YERSINIA Saussure.

solitaria Scudd., Can. ent., xxviii, 209 (1896).
Colorado, Nebraska.

LITANEUTRIA Saussure.

borealis Brun., Publ. Nebr. acad. sc., iii, 22 (1893)— Ameles.
Scudd., Can. ent., xxviii, 209 (1896).
Nebraska.

minor Scudd., Rep. U. S. geol. surv. Nebr., 251 (1871)—Stagmatoptera.
Sauss., Mant. amér., 54 (1871)—Stagmomantis.
Scudd., Can. ent., xxviii, 209 (1896).
Nebraska to Texas.

obscura Scudd., Can. ent., xxviii, 209-210 (1896).
Arizona, California.

pacifica Scudd., Can. ent., xxxviii, 210 (1896).
California.

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TENODERA Burmeister.

sinensis Sauss., Ent. news, ix, 144-145, pl. 9 (1898).
aridifolia var. *sinensis* Sauss., Mel. orth., i, 419, pl. 7, fig. 62 (1871).
Introduced: Pennsylvania.

PHASMOMANTIS Saussure.

sumichrasti Sauss., Rev. mag. zool., 1861, 126 (1861)—Mantis (Car dioptera).
Sauss., Mitth. schweiz. ent. ges., iii, 69 (1869).
mexicana Sauss., Rev. mag. zool., 1861, 127 (1861).
Texas.

CALLIMANTIS Stål.

floridana Scudd., Can. ent., xxviii, 210 (1896)
Florida.

STAGMOMANTIS Saussure.

carolina Linn., Cent. ins. rar., 13 (1763)—Gryllus (Mantis).
Linn., Syst. nat., ed. xii, ii, 691 (1767)—Mantis.
Burm., Handb. ent., ii, 538 (1838)—Mantis (Stagmatoptera).
Sauss., Mitth. schweiz. ent. ges., iii, 65 (1869).
Ril., Stand. nat. hist., ii, 173-174, fig. 249, 250 (1884)—Phasmomantis).
How., Proc. ent. soc. Wash., ii, 251-252 (1892)—Mantis (Stagmomantis).
irrorata Linn., Cent. ins. rar., 14 (1763)—Gryllus (Mantis).
cuticularis Serv., Orth,, 189-190 (1839)—Mantis.
conspurcata Serv., Ibid., 190 (1839)—Mantis.
inquinata Serv., Ibid., 191 (1839)—Mantis.
ferox Sauss., Rev. mag. zool., 1859, 60 (1859)—Mantis (Stigmatoptera).
tolteca Sauss., Ibid., 1861, 127 (1861)—Mantis (Stagmatoptera).
stollii Sauss., Mitth. schweiz. ges., iii, 65 (1869).
dimidiata Sauss., Mant. amér., 48-50 (1871).
wheeleri Thom., Rep. U. S. geol. surv. west 100 mer., v, 849 (1875)—Mantis.
Southern U. S.
limbata Hahn, Icon. Orth., pl. A, gen. Mantis, fig. 2 (1836)—Mantis.
Sauss., Miss. scient. Mex., Rech. zool, vi, 249-251, pl. 6, fig. 11, 11a (1872).
latipennis Burm., Handb. ent., ii, 538 (1838)—Mantis (Stagmatoptera).

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viridimargo Burm., Ibid., ii, 532 (1838)—Mantis (Photina).
cellularis Burm., Ibid., ii, 532 (1838)—Mantis (Photina).
azteca Sauss., Rev. mag. zool., 1859, 60 (1859)—Mantis (Stigmatoptera).
Texas to Arizona.

GONATISTA Saussure.

grisea Fabr., Ent. syst., 22 (1793)—Mantis.
Sauss., Mant. amér., 23-25 (1871).
reticulata Thunb., Mém. acad. St. Petersb., v, 288 (1815)—Mantis.
phryganoides Serv., Orth., 198 (1839)—Mantis.
bifasciata De Haan, Bijdr. kenn. Orth., 60, 78 (1842)—Mantis.
cubensis Sauss., Mitth. schweiz. ges., iii, 61 (1869).
Indiana to Florida.

BRUNNERIA Saussure.

borealis Scudd., Can. ent., xxviii, 212 (1896).
Texas.

OLIGONYX Saussure.

scudderi Sauss., Mitth. schweiz. ent. ges., iii, 239 (1870).
missouriensis Glov., Ill. N. A. ent., Orth., pl. 13, fig. 11 (1872)—Mantis.
hollianus Sauss.-Zehntn., Biol. centr. amer., Orth., 173, pl. 9, fig. 17 (1894).
Southern U. S. east of Rocky Mts.

uhleri Stål, Bih. sv. vet. akad. handl., iv, no. 10, 66 (1877).
Louisiana.

BACTROMANTIS Scudder.

virga Scudd., Can. ent., xxviii, 213 (1896).
?*baculina* Bates, Westw., Rev. Mant., 5 (1889) undescr.—Thesprotia.
Florida.

THESPROTIA Stål.

graminis Scudd., Proc. Bost. soc. nat. hist., xix, 90 (1877)—Oligonyx.
Scudd., Can. ent., xxviii, 213, 214 (1896).
Georgia, Florida.

VATINAE.

THEOCLYTES Serville.

chlorophaea Blanch., Guér., Mag. zool., v, 135 (1835)—Mantis.
Serv., Orth., 153 (1839).

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Blanch., Hist. nat. ins., iii, 2, pl. 3, fig. 1 (1840)—Empusa.
Westw., Rev. Mant., 24 (1889)—Pseudovates.
azteca Sauss., Rev. mag. zool., 1859, 61 (1859).
mexicana Sauss., Ibid., 1861, 127 (1861).
Gulf States; accidental in New York.

PHASMIDAE.

BACUNCULINAE.

DIAPHEROMERA Gray.

denticrus Stål, Rec. Orth., iii, 76 (1875).
Louisiana, Texas.

femorata Say, Exp. Long, ii, 297 (1824)—Spectrum.
Harr., Treat. ins. inj. veg., 119 (1841).
Haan, Bijdr. kenn. Orth., 101, 134 (1842)—Phasma (Bacteria).
Uhl., Harr., Ins. inj. veg., 3 ed., 146 (1862)—Bacunculus.
sayi Gray, Syn. Phasm., 18 (1835).
linearis Gosse, Alab., 275 (1859)—Bacteria.
Northern U. S. and Canada east of Rocky Mts.

veliei Walsh [*velii*], Proc. ent. soc. Philad., iii, 410 (1864).
Nebraska.

SERMYLE Stål.

strigata Scudd. (See Appendix.)
Texas.

BACUNCULUS Burmeister.

tenuescens Scudd. (See Appendix.)
Florida.

ANISOMORPHINAE.

ANISOMORPHA Gray.

bivittata Say, Amer. ent., iii., pl. 38 (1828)—Spectrum.
Harr., Treat. ins. inj. veg., 119 (1841)—Diapheromera.
Scudd., Can. ent., xxvii, 30 (1895).
vittata Jaeg., N. Amer. ins., 173 (1854)—Spectrum.
Southern U. S.

buprestoides Stoll', Repr. spectr., 68, pl. 23, fig. 87, (1787-1813)—Phasma.
Gray, Syn. Phasm., 19 (1835).

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Haan, Bijdr. kenn. Orth., 101 (1842)—Phasma (Anisomorpha).
Southern U. S.

ferruginea Palis., Ins. Afr. Amér., 166, pl. 14, figs. 6, 7 (1805-1821)—Phasma.
Gray, Syn. Phasm., 18 (1835).
Haan, Bijdr. kenn. Orth., 101 (1842)—Phasma (Anisomorpha).
Southern U. S.

TIMEMA Scudder.

californicum Scudd., Can. ent., xxvii, 30 (1895).
California.

BACILLINAE.

BACILLUS Latreille.

carinatus Scudd., Psyche, vi, 372 (1893).
Arizona.

coloradus Scudd., Psyche, vi, 372 (1893).
Colorado.

ACRIDIIDAE.

TETTIGINAE.

Tettigiae.

NOMOTETTIX Morse.

acuminatus Hanc., Ent. news, x, 8 (1899).
Kansas.

compressus Morse, Journ. N. Y. ent. soc., iii, 15 (1895).
N. Carolina.

cristatus Scudd., Bost. journ. nat. hist.., vii, 478 (1862)—Batrachidea.
Pack., Rep. nat. hist. Me., 1861, 375 (1862)—Tetrix.
Bol., Ann. soc. ent. Belg., xxxi, 260-261 (1887)—Tettix.
Morse, Psyche, vii, 150-152, pl. 6, fig. 1a-d (1894).
carinatus Scudd., Bost. journ. nat. hist, vii, 479 (1862)—Batrachidea.
Eastern U. S

parvus Morse, Journ. N. Y. ent. soc., iii, 14-15 (1895).
Minnesota.

NEOTETTIX Hancock.

bolivari Hanc., Ent. news, ix., 139-140, pl. 8, fig. 2, 2a-d (1898).
femoratus Bol. (nec Scudd.), Ann. soc. ent. Belg., xxxi, 264 (1887)—Tettix.
Southern states.

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NEOTETTIX (Continued).

bolteri Hanc., Ent. news, ix, 139, 140, pl. 8, fig. 1, 1a-e (1898).
Florida.

femoratus Scudd., Trans. amer. ent. soc., ii, 306 (1869)—Tettix.
Hanc., Ent. news, ix, 139, 140-141 (1898).
Southern and western States.

rotundifrons Hanc., Ent. news, ix, 139, pl. 8, fig. 3, 3a-d (1898).
Florida.

TETTIX Charpentier.

acadicus Scudd., Daws., Rep. geol. 49 par., 345 (1875)—Tettigidea.
Scudd., Ann. rep. chief eng., 1876, 515 (1876).
Canada.

angustus Hanc., Trans. amer. ent. soc., xxiii, 238, pl. 6, fig. 4, 4a, pl. 9, fig. 24 (1896).
Illinois.

arenosus Burm., Handb. ent., ii, 659 (1838)—Tetrix.
Haan, Bijdr. kenn. Orth., 167 (1842)—Acridium (Tetrix).
Walk , Cat. Derm. salt. Brit. mus., v, 813 (1871).
Southern and western states.

brunneri Bol , Ann. soc. ent. Belg., xxxi, 266-267, pl. 2, fig. 22, 22a (1887).
Hudson Bay.

crassus Morse, Journ. N. Y. ent. soc., vii, 201 (1899).
Colorado.

decoratus Hanc., Trans. amer. ent. soc., xxiii, 240-241, pl. 7, fig. 7, 7a, pl. 9, fig. 31 (1896).
Illinois.

fluctuosus Hanc., Trans. amer. ent. soc., xxiii, 240, pl. 7, fig. 6, 6a (1896).
Illinois.

gibbosus Hanc., Trans. amer. ent. soc., xxiii, 239-240, pl. 6, fig. 5, 5a, pl. 8, fig. 14-19, pl. 9, fig. 30, 31a (1896).
Illinois.

granulatus Kirb., Faun. bor. amer., iv, 251 (1837)—Acridium.
Scudd., Can. nat., vii, 288 (1862).
ornatus Harr. (nec Say), Ins. inj. veg., 150 (1841)—Tetrix.
Eastern and northern N. America.

hancocki Morse, Journ. N. Y. ent. soc., vii, 200-201 (1899).
Montreal to S. Dakota and Nebraska.

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incurvatus Hanc., Amer. nat., xxix, 761-762, fig. 1 (1895).
Washington.

inflatus Hanc., Trans. amer. ent. soc., xxxii, 238, pl. 7, fig. 8, pl. 9, fig. 26 (1896).
Illinois.

luggeri Hanc., Lugg., Orth. Minn., 109 (1898).
Minnesota.

obscurus Hanc., Trans. amer. ent. soc., xxiii, 239, pl. 7, fig. 9, 9a, 10, 10a, pl. 9, fig. 23, 25 (1896).
Western States.

ornatus Say, Amer. ent., pl. 5 (1824)—Acridium.
Harr., Cat. ins. Mass., 57 (1835)—Tetrix.
Scudd., Bost. journ. nat. hist., vii, 474 (1862).
dorsalis Harr., Ins. inj. veg., 151 (1841)—Tetrix.
bilineatus Harr., Ibid., 151 (1841)—Tetrix
quadrimaculatus Harr., Ibid., 151 (1841)—Tetrix.
sordidus Harr., Ibid., 151 (1841)—Tetrix
triangularis Scudd., Bost journ. nat. hist., vii, 475 (1862).
Northern and eastern N. America.

oxycephalus Burm., Handb. ent., ii, 659 (1838)—Tetrix.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Tetrix.)
Walk., Cat. Derm. salt. Brit. mus., v, 813 (1871).
S. Carolina.

tentatus Morse, Journ. N. Y. ent. soc., vii, 200 (1899).
Alberta and Wyoming to Oregon and California.

PARATETTIX Bolivar.

cucullatus Burm., Handb. ent., ii, 658-659 (1838)—Tetrix.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Tetrix).
Scudd., Bost. journ. nat. hist., vii, 475 (1862)—Tettix.
Morse, Psyche, vii, 163-164, pl. 6, fig. 4, 4a (1894).
Eastern N. America.

hesperus Morse, Journ. N. Y. ent. soc., vii, 198 (1899).
Oregon, California.

mexicanus Sauss., Rev. mag. zool., 1861, 400 (1861)—Tettix.
Bol., Ann. soc. ent. Belg., xxxi, 275 (1887).
Southern States.

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PARATETTIX (Continued).

rugosus Scudd., Bost journ. nat. hist., vii, 476 (1862)—Tettix.
Bol., Ann. soc. ent. Belg., xxxi, 273-274 (1887).
Florida, Nebraska.

toltecus Sauss., Rev. mag. zool., 1861, 401 (1861)—Tettix.
Bol., Ann. soc. ent. Belg., 31, 273 (1887)
Southwestern States, California.

Batrachideae.

PAXILLA Bolivar.

obesa Scudd., Proc. Bost. soc. nat. hist., xix, 34 (1877)—Tettigidea.
Bol., Ann. soc. ent. Belg., xxxi, 294-295 (1887).
Georgia.

TETTIGIDEA Scudder.

acuta Morse, Journ. N. Y. ent. soc., iii, 15-16 (1895).
New York.

apiculata Morse, Journ. N. Y. ent. soc., iii, 16 (1895).
Louisiana.

armata Morse, Journ. N. Y. ent. soc., iii, 107 (1895).
Southern States.

lateralis Say, Amer. ent., pl. 5 (1824)—Acridium.
Harr., Hitchc, Rep. geol. Mass., 583 (1833)—Tetrix.
Scudd., Bost journ. nat. hist., vii, 477 (1862).
Walk., Cat. Derm. salt. Brit. mus., v, 813 (1871).
polymorpha Burm., Handb. ent., ii, 659 (1838)—Tetrix.
Southern U. S., east of Rocky Mts.

parvipennis Harr., Ins. inj. veg., 152 (1841)—Tetrix.
Walk., Cat. Derm. salt. Brit. mus., v, 814 (1871)—Tettix.
Morse, Journ. N. Y. ent. soc., iii, 108-109 (1895.)
Northern U. S., east of Rocky Mts.

prorsa Scudd., Proc. Bost. soc. nat. hist , xix, 34 (1877).
Georgia.

spicata Morse, Journ. N. Y. ent. soc., iii, 108 (1895).
Southeastern States.

MASTACINAE.

MORSEA Scudder.

californica Scudd., Psyche, viii, 179 (1898).
California.

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TRYXALINAE.

Hyalopteriges.

RHADINOTATUM McNeill.

brevipenne Thom., Rep. U.S. geol. surv. terr., v, 58, pl, fig. 12 (1873) —Tryxalis.
Scudd., Proc. Bost. soc. nat. hist., xix, 88 (1877)—Achurum.
McNeill, Proc. Dav. acad. nat. sc., vi, 200-201, pl. 1, fig. 1, 1a, 1a (1897).
Florida.

ACHURUM Saussure.

sumichrasti Sauss., Rev. mag. zool., 1861, 313 (1861)—Tryxalis (Achurum).
Walk., Cat. Derm. salt. Brit. mus., iii, 518 (1870).
Arizona.

TRYXALIS Fabricius.

brevicornis Linn., Syst. nat., ed. 12, ii, 692 (1767)—Gryllus (Acrida).
Fabr., Syst. ent., 279 (1775)
Walk., Cat. Derm. salt. Brit. mus., iii, 500 (1870)—Pyrgomorpha.
ensicornu De Geer, Mém., iii, 499, pl. 42, fig. 7 (1773) —Acrydium.
notochlora Palis., Ins. Afr. Amér., 80, pl. 3, fig. 3 (1807).
viridula Palis., Ibid., 81, pl. 3, fig. 4 (1807).
punctipennis Serv., Orth., 590 (1839)—Opsomala.
Southern U. S.

Mermiriae.

MERMIRIA Stål.

alacris Scudd., Proc. Bost. soc. nat. hist., xix, 30 (1877).
Southern states.

bivittata Serv., Orth., 589 (1839)—Opsomala.
Haan, Bijdr. kenn. Orth., 144 (1842)—Acridium (Opsomala).
Scudd., Proc. Bost. soc. nat. hist., xix, 30 (1877).
maculipennis Brun., Proc. U. S. nat. mus., xii, 54-55 (1890).
U. S., east of Rocky Mts.

intertexta Scudd., Proc. amer. acad. arts sc., xxxv, 41, 42-43 (1899).
Southern U. S.

neomexicana Thom., Proc. acad. nat. sc. Philad., 1870, 77 (1870)—Opomala.

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MERMIRIA (Continued).

Scudd., Bull. U. S. geol. surv. terr., ii, 262 (1876).
belfragei Stål, Rec. Orth., i, 102 (1873).
Rocky Mts. to Mississippi River.

rostrata McNeill, Proc. Dav. acad. nat. sc., vi, 205, 207-208, pl. 1, fig. 3c (1897).
Indian Terr.

texana Brun., Proc. U. S. nat. mus., xii, 53-54, pl. 1, fig. 11 (1890).
Southwestern U. S.

vigilans Scudd., Proc. amer. acad. arts sc., xxxv, 42, 43-44 (1899).
N. Carolina.

SYRBULA Stål.

acuticornis Brun., Proc. U. S. nat. mus., xii, 55 (1890).
Texas, Arizona.

admirabilis Uhl., Proc. ent. soc. Philad., ii, 553 (1864)—Stenobothrus.
Thom., Rep. ent. Ill., ix, 88, 93, 100-102 (1880).
?*montezuma* Sauss., Rev. mag. zool., 1861, 316 (1861)—Oxycoryphus.
leucocerca Stål, Rec. Orth., i, 102 (1873).
U. S. east of Rocky Mts. to Atlantic.

fuscovittata Thom., Rep. U. S. geol. surv. west 100 mer., v, 870, pl. 45, fig. 7 (1875).
Arizona.

Acrolophiti.

ACROLOPHITUS Thomas.

hirtipes Say, Amer. ent., iii, pl. 34 (1828)—Gryllus.
Thom., Ann. rep. U. S. geol. surv. terr., ii, 266, 278 (1871).
Rocky Mt. region.

ACROCARA Scudder.

pulchellum Brun., Proc. U. S. nat. mus., xii, 60-61, pl. 1, fig. 10 (1890)—Pedioscirtetes.
Scudd., Psyche, v, 437 (1890).
Idaho.

PEDIOSCIRTETES Thomas.

nevadensis Thom., Proc. acad. nat. sc. Philad., 1873, 295 (1873).
Nevada.

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GYMNES Scudder.

punctatus Scudd., Psyche, v, 440-441 (1890).
California.

Bootettiges.

BOOTETTIX Bruner.

argentatus Brun., Proc. U.S. nat. mus., xii, 58-60, pl. 1, fig. 4, 5 (1890).
Texas, New Mexico.

Amblytropidiae.

ERITETTIX Bruner.

carinatus Scudd., Proc. Bost. soc. nat. hist., xvii, 511 (1875)—Gomphocerus.
McNeill, Proc. Dav. acad. nat. sc., vi, 218, 219 (1897).
Middle states.

navicula Scudd., Ann. rep. chief eng., 1876, 506 (1876)—Gomphocerus.
McNeill, Proc. Dav. acad. nat. sc., vi, 218, 220 (1897).
Plains east of Rocky Mts.

simplex Scudd., Trans. amer. ent. soc., ii, 305 (1869)—Gomphocerus.
McNeill, Proc. Dav. acad. nat. sc., vi, 218, 219-220 (1897).
Delaware, Maryland.

tricarinatus Thom., Rep. U. S. geol. surv. terr., v, 84 (1873)—Stenobothrus.
Brun., Publ. Nebr. acad. sc., iii, 22 (1893).
Northwestern states east of Rocky Mts.

variabilis Brun., Proc. U. S. nat. mus., xii, 56 (1890).
N. Mexico.

virgatus Scudd., Proc. Bost. soc. nat. hist., xvii, 511 (1875)—Gomphocerus.
McNeill, Proc. Dav. acad. nat. sc., vi, 218-219, pl. 2, fig. 9, 9ab (1897).
vernalis Brun., Publ. Nebr. acad. sc., iii, 22 (1893).
Nebraska to Texas.

MESOCHLOA Scudder.

abortiva Brun., Proc. U. S. nat. mus., xii, 56-57, pl. 1, fig. 8, 9 (1890)—Eritettix.
Scudd., Psyche, viii, 239 (1898).
Texas.

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MACNEILLIA Scudder.

obscura Scudd., Proc. Bost. soc. nat. hist., xix, 88 (1877)—Chrysochraon.

McNeill, Proc. Dav. acad. nat. sc., vi, 216, pl. 2, fig. 8, 8ab (1897) Pedeticum.

Scudd., Psyche, viii, 239 (1898).

Florida.

ACENTETUS McNeill.

carinatus Scudd., Proc. amer. acad. arts sc., xxxv, 45 (1899).

Colorado.

unicolor McNeill, Proc. Dav. acad. nat. sc., vi, 225-226, pl. 3, fig. 12, 12ab (1897).

Colorado.

AMPHITORNUS McNeill.

bicolor Thom., Ann. rep. U. S. geol. surv. terr., v, 465 (1872)—Stenobothrus.

McNeill, Proc. Dav. acad. nat. sc., vi, 224-225, pl. 3, fig. 11, 11ab (1897).

coloradus Thom., Rep. U. S. geol. surv. terr., v, 82 (1873)—Stenobothrus.

Montana to Kansas.

ornatus McNeill, Proc. Dav. acad. nat. sc. vi, 224, 225 (1897).

California.

OPEIA McNeill.

obscura Thom., Ann. rep. U. S. geol. surv. terr., v, 466 (1871)—Oxycoryphus.

McNeill, Proc. Dav. acad. nat. sc., vi, 215-216, pl. 2, fig. 7, 7a-c (1897).

Plains east of Rocky Mts.

testacea Scudd., Proc. amer. acad. arts sc., xxxv, 45-46 (1899).

California.

AMBLYTROPIDIA Stål.

occidentalis Sauss., Rev. mag. zool., 1861, 317 (1861)—Stenobothrus (Rhammatocerus).

Walk., Cat. Derm. salt. Brit. mus., iv, 755, 756 (1870)—Stenobothrus.

McNeill, Proc. Dav. acad. nat. sc., vi, 226, 227, pl. 3, fig. 13, 13ab (1897).

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subhyalina Scudd., Proc. Bost. soc. nat. hist., xvii, 511 (1875).
Prov., Faune ent. Can., ii, 44 (1877)—Chloealtis (Amblytropidia).
Southern U. S.

Phlibostromae.

ALPHA Brunner.

cinerea Brun., Proc. U. S. nat. mus., xii, 52-53 (1890)—Ochrilidea.
McNeill, Proc. Dav. acad. nat. sc., vi, 246, 247 (1897).
Plains east of Rocky Mts.

crenulata Brun., Proc. U. S. nat. mus., 51-52 (1890)—Ochrilidea.
McNeill, Proc. Dav. acad. nat. sc., vi, 246, 247 (1897).
Rocky Mt. region.

occipitalis Thom., Rep. U. S. geol. surv. terr., v, 81 (1873)—Stenobothrus.
Thom., Proc. Dav. acad. nat. sc., i, 251 (1876)—Oxycoryphus.
Brun., Publ. Nebr. acad. sc., iii, 22 (1893)—Ochrilidea.
Brunn., Rev. syst. Orth., 121 (1893).
Plains east of Rocky Mts., Arizona.

PHLIBOSTROMA Scudder.

quadrimaculatum Thom., Ann. rep. U. S. geol. surv. terr., ii, 266, 280 (1871)—Stenobothrus.
Brun., Bull. Washb. coll., i, 135 (1885).
pictum Scudd., Proc. Bost. soc. nat. hist., xvii, 517 (1875).
parvum Scudd., Ann. rep. chief eng., 1876, 510 (1876).
lactum Uhl., Bull. U. S. geol. surv. terr., iii, 792-793 (1877)—Stenobothrus.
Rocky Mts. and plains to eastward.

Orphulae.

ORPHULELLA Giglio-Tos.

affinis Scudd., Can. ent., xxxi, 178, 183 (1899).
?*tepanica* McNeill (nec Sauss.), Proc. Dav. acad. nat. sc., vi, 242-243, pl. 4, fig. 17a (1897)—Orphula.
California.

compta Scudd., Can. ent., xxxi, 178, 180-181 (1899).
California, Arizona.

decora McNeill, Proc. Dav. acad. nat. sc., vi, 239-240, pl. 4, fig. 17d (1897)—Orphula.

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ORPHULELLA (Continued).

Scudd., Can. ent., xxxi, 178, 181 (1899).
Texas to Colorado.

desereta Scudd., Can. ent., xxxi, 178, 184-185 (1899).
Utah.

obliquata Scudd., Can. ent, xxxi, 178, 181-182 (1899).
Texas to Colorado.

olivacea Morse, Psyche, vi, 477-478, figs. 1, 2 (1893)—Stenobothrus.
Morse, Ibid, vii, 327, 411, pl. 7, fig. 10, 10a (1896)—Orphula.
Gigl.-Tos, Boll. mus. zool. Tor., xii, no. 301, 2 (1897)—Orphula (Orphulella).
Scudd., Can. ent., xxxi, 179, 187 (1899).
Atlantic States.

pelidna Burm., Handb. ent., ii, 650 (1838)—Gomphocerus.
Thom., Rep. U. S. geol. surv. terr., v, 95 (1873)—Stenobothrus.
McNeill, Proc. Dav. acad. nat. sc., vi, 235-239 (1897)—Orphula.
Scudd., Can. ent., xxxi, 179, 187 (1899).
maculipennis Scudd., Bost. journ. nat. hist., vii, 458-459 (1862)—Stenobothrus.
propinquans Scudd., Ibid., vii, 461 (1862)—Stenobothrus.
Massachusetts to California and Florida.

picturata Scudd., Can. ent., xxxi, 178, 182 (1899).
Texas.

pratorum Scudd., Can. ent., xxxi, 179, 186 (1899).
Southern U. S.

salina Scudd., Can. ent., xxxi, 179, 185-186 (1899).
Colorado, Utah.

speciosa Scudd., Bost. journ. nat. hist., vii, 458 (1862)—Stenobothrus.
McNeill, Proc. Dav. acad. nat. sc., vi, 240-242, pl. 4, fig. 17c (1897)—Orphula.
Scudd., Can. ent., xxxi, 178, 183-184 (1899).
aequalis Scudd., Bost. journ. nat. hist., vii, 459-460 (1862)—Stenobothrus.
bilineata Scudd., Ibid., vii, 460-461 (1862)—Stenobothrus.
gracilis Scudd., Rep. U. S. geol. surv. Nebr., 250 (1871)—Stenobothrus.
Nova Scotia to Texas.

tepaneca Sauss., Rev. mag. zool., 1861, 319 (1861)—Stenobothrus (Rhammatocerus).

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Walk., Cat. Derm. salt. Brit. Mus., iv, 756 (1870)—Stenobothrus.
Scudd., Can. ent., xxxi, 177 (1899).
Texas.

DICHROMORPHA Morse.

brunnea Scudd., Proc. Bost. soc. nat. hist., xvii, 510 (1875)—Chloealtis.
McNeill, Proc. Dav. acad. nat. sc., vi, 231, 232, pl. 3, fig. 15, 15ab (1897).
Southern U. S.

viridis Scudd., Bost. journ. nat. hist., vii, 455 (1862)—Chloealtis.
Walk., Cat. Derm. salt. Brit. mus., iv, 755 (1870)—Stenobothrus.
Scudd., Hitchc., Rep. geol. N. H., i, 372 (1874)—Chrysochraon.
Thom., Bull. Ill. mus. nat. hist., i, 61 (1876)—Tryxalis.
Morse, Psyche, vii, 326, 383-384, pl. 7, fig. 7, 7ab (1896).
punctulata Scudd., Bost. journ. nat. hist., vii, 455 (1862)—Chloealtis.
brevipennis Thom., Trans. Ill. st. agric. soc., v, 451 (1865)—Opomala.
augusticornis Stål., Rec: Orth., i, 105 (1873)—Tryxalis.
U. S. east of Rocky Mts.

CLINOCEPHALUS Morse.

elegans Morse, Psyche, vii, 326, 402, pl. 7, fig. B, Ba (1896).
Atlantic States.

CHLOEALTIS Harris.

abdominalis Thom., Rep. U. S. geol. surv. terr., v, 74 (1874)—Chrysochraon.
Brun., Can. ent , xvii, 10 (1885).
Northern States west of Mississippi River.

conspersa Harr., Ins. inj. veg., 149 (1841)—Locusta (Chloealtis).
Scudd., Can. nat., vii., 286 (1862).
Walk., Cat. Derm. salt. Brit. mus., iv, 755 (1870)—Stenobothrus.
Thom., Rep. U. S. geol. surv. terr., v, 76 (1874)—Chrysochraon.
Thom., Bull. Ill. mus. nat. hist., i, 61 (1876)—Tryxalis.
abortiva Harr., Ins. inj. veg., 149 (1841)—Locusta (Chloealtis).
Northern U. S. and Canada east of Great Plains.

Stenobothri.

NAPAIA McNeill.

gracilis McNeill, Proc. Dav. acad. nat. sc., vi, 213-214, pl. 2, fig. 6, 6a-d (1897).

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alta Scudd., Proc. amer. acad. arts sc., xxxv, 47-48 (1899)—Oeconomus.
California.

HORESIDOTES Scudder.

cinereus Scudd., Proc. amer. acad. arts sc., xxxv, 49-50 (1899).
California.

STENOBOTHRUS Fischer.

curtipennis Harr., Cat. ins. Mass., 56 (1835)—Locusta.
Harr., In. inj. veg., 149 (1841)—Locusta (Chloealtis).
Pack., Rep. nat. hist. Me., 1861, 376 (1861)—Chloealtis.
Scudd., Can. nat., vii, 286 (1862).
longipennis Scudd., Bost. journ. nat. hist., vii, 457 (1862).
coloradensis McNeill, Proc. Dav. acad. nat. sc., vi, 260, 262-263, pl. 5, fig. 25, 25ab (1897).
Northern U. S. and Canada east of Sierra Nevadas.

oregonensis Scudd., Proc. amer. acad. arts sc., xxxv, 50-51 (1899).
California, Oregon.

PLATYBOTHRUS Scudder.

brunneus Thom., Ann. rep. U. S. geol. surv. terr., ii, 266, 280 (1871)—Stenobothrus.
Caulf., Rep. ent. soc. Ont., xviii, 70 (1888)—Gomphocerus.
Scudd., Psyche, viii, 239 (1898).
Nebraska and Colorado to Sierra Nevadas.

sordidus McNeill, Proc. Dav. acad. nat. sc., vi, 260, 263-264, pl. 5, fig. 25c (1897)—Stenobothrus.
Idaho.

BRUNERIA McNeill.

shastana Scudd., Rep. U. S. ent. comm., ii, app., 25, pl. 17, fig. 15, 18 (1881)—Gomphocerus.
McNeill, Proc. Dav. acad. nat. sc., vi, 265, pl. 5, fig. 26, 26ab (1897)—Brunneria. Cf. Psyche, viii, 71.
Scudd., Appal., viii, 306 (1898).
California.

GOMPHOCERUS Thunberg.

carpenterii Thom., Bull. U. S. geol. surv. terr., i, no. 2, ser. 1, 65 (1874).
Thom., Proc. Dav. acad. nat. sc., i, 251 (1876)—Stenobothrus.
Mountains of Colorado.

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clavatus Thom., Rep. U. S. geol. surv. terr., v, 96 (1873).
Eastern slope of Rocky Mts.

clepsydra Scudd., Daws., Rep. geol. 49 par., 344 (1875).
Eastern slope of Rocky Mts.

Scyllinae.

BOOPEDON Thomas.

auriventris McNeill, Can. ent., xxxi, 54-55 (1899).
Arkansas.

flavofasciatum Thom., Proc. acad. nat. sc. Philad., 1870, 84 (1870).
Plains east of Rocky Mts.

nubilum Say, Journ. acad. nat. sc. Philad., iv, 308 (1825)—Gryllus. Thom., Ann. rep. U. S. geol. surv. terr., ii, 265, 272, 273 (1871).
nigrum Thom., Proc. acad. nat. sc. Philad., 1870, 83 (1870).
Eastern slope of Rocky Mts.

PLECTROTETTIX McNeill.

patriae Scudd. (See Appendix.)
California.

EUPNIGODES McNeill.

megacephala McNeill, Proc. Dav. acad. nat. sc., vi, 267, pl. 6, fig. 28, 28ab (1897)—Pnigodes. Cf. Psyche, viii, 71.
California.

PSOLOESSA Scudder.

buddiana Brun., Proc. U. S. nat. mus., xii, 61-62, pl. 1, fig. 6 (1890).
Texas.

ferruginea Scudd., Proc. Bost. soc. nat. hist., xvii, 513 (1875).
Nebraska, Texas, Arizona.

maculipennis Scudd., Proc. Bost. soc. nat. hist., xvii, 513 (1875).
Texas to California and Nebraska.

texana Scudd., Proc. Bost. soc. nat. hist., xvii, 512 (1875). McNeill, Proc. Dav. acad. nat. sc., vi, 271, 272, pl. 6, fig. 30c (1897)—Stirapleura.
Texas, California.

STIRAPLEURA Scudder.

decussata Scudd., Ann. rep. chief eng., 1876, 510 (1876).
coloradensis Thom., Proc. Dav. acad. nat. sc., i, 252, pl. 36, fig. 3, 4 (1876)—Psoloessa.
Rocky Mt. region.

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STIRAPLEURA (Continued).

delicatula Scudd., Bull. U.S. geol. surv. terr., ii, 263 (1876)—Scyllina.
McNeill, Proc. Dav. acad. nat. sc., vi, 271, 272 (1897).
Colorado.

eurotiae Brun., Proc. U. S. nat. mus., xii, 62-63 (1890)—Psoloessa.
McNeill, Proc. Dav. acad. nat. sc., vi, 271, 272 (1897).
Colorado.

ornata Scudd., Ann. rep. chief eng., 1876, 507 (1876)—Dociostaurus.
McNeill, Proc. Dav. acad. nat. sc., vi, 270, 271 (1897).
N. Mexico.

pusilla Scudd., Proc. amer. acad. arts sc., xxxv, 52-53 (1899).
New Mexico, California.

tenuicarina Scudd., Proc. amer. acad. arts sc., xxxv, 53-54 (1899).
Texas.

AGENEOTETTIX McNeill.

deorum Scudd., Bull. U. S. geol. surv. terr., ii, 262 (1876)—Chrysochraon.
McNeill, Proc. Dav. acad. nat. sc., vi, 268-269, pl. 6, fig. 29, 29ab (1897)—Eremnus. Cf. Psyche, viii, 77.
Colorado.

scudderi Brun., Proc. U. S. nat. mus., xii, 63-64 (1890)—Aulocara.
McNeill, Proc. Dav. acad. nat. sc., vi, 268, 269 (1897)—Eremnus. Cf. Psyche, viii, 77.
parvus McNeill (nec Scudd.), Psyche, vi, 64 (1891)—Philobostroma.
Rocky Mts. to Mississippi River, Illinois, Indiana.

AULOCARA Scudder.

elliotti Thom., Proc. acad. nat. sc. Philad., 1870, 82 (1870)—Stauronotus.
Sauss., Prodr. Oedip., 79 (1884)—Oedocara.
Brun., Can. ent., xvii, 10 (1885).
coeruleipes Scudd., Bull. U. S. geol. surv. terr., ii, 266 (1876).
decens Scudd., Ibid., ii, 267 (1876).
strangulatum Scudd., Ann. rep. U. S. geol. surv. west 100 mer., 1876, 289 (1876)—Oedocara.
Texas, Colorado and Wyoming to the Pacific.

femoratum Scudd., Proc amer. acad. arts sc., xxxv, 54, 55-56 (1899).
Kansas to Utah.

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parallelum Scudd., Proc. amer. acad. arts sc., xxxv, 55, 57 (1899).
Utah.

rufum Scudd., Proc. amer. acad. arts sc., xxxv, 54, 55 (1899).
Colorado.

Epacromiae.

LIGUROTETTIX McNeill.

coquilletti McNeill, Proc. Dav. acad. nat. sc. vi, 258-259, pl. 5, fig. 24, 24a-c (1897).
California.

MECOSTETHUS Fieber.

gracilis Scudd. Can. nat., vii, 286 (1862)—Arcyptera
Thom., Rep. U. S. geol. surv. terr., v, 99 (1873)—Stethophyma.
Morse, Psyche, vii, 327, 444-445, pl. 7, fig. 14 (1896).
Nova Scotia to Dakota.

lineatus Scudd., Bost. journ. nat. hist., vii, 462 (1862)—Arcyptera.
Thom., Rep. U. S. geol. surv. terr., v, 98 (1873)—Stethophyma.
Morse, Psyche, vii, 327, 444-445, pl. 7, fig. 14 (1896).
?*variegatus* Walk (nec Stoll'), Cat. Derm. salt. Brit. mus., iv, 781-782 (1870)—Stethophyma.
Northern U. S. east of Rocky Mts.

platypterus Scudd., Bost. journ. nat. hist., vii, 463 (1862)—Arcyptera.
Thom., Rep. U.S. geol. surv. terr., v, 99 (1873)—Stethophyma.
Morse, Psyche, vii, 327, 445, pl. 7, fig. 15, 15ab (1896).
New England.

OEDIPODINAE.

Oedipodini.

ARPHIA Stål.

arcta Scudd., Bull. U. S. geol. surv. terr., ii, 263 (1876).
Colorado, Minnesota.

behrensi Sauss., Prodr. Oedip., 71-72 (1884).
California.

carinata Scudd., Trans. amer. ent. soc., ii, 306 (1869)—Oedipoda.
Thom., Rep. U. S., geol. surv. terr., v, 106 (1873)—Tomonotus.
Uhl., Bull. U. S. geol. surv. terr., iii, 794 (1877).
Western Mississippi Valley.

conspersa Scudd., Proc. Bost. soc. nat. hist., xvii, 514 (1875).
Iowa to Texas.

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ARPHIA (continued).

crepusculum Sauss., Prodr. Oedip., 67 (1884).
Texas.

frigida Scudd., Daws., Rep. geol. 49th par., 344 (1875).
Caulf., Can. rec. sc., ii, 400 (1887)—Oedipoda (Arphia).
Alaska to Montana.

granulata Sauss., Prodr. Oedip., 67 (1884).
Florida, Nebraska.

infernalis Sauss., Prodr. Oedip., 70 (1884).
Texas.

luteola Scudd., Proc. Bost. soc. nat. hist., xvii, 515 (1875).
Texas, Colorado, Utah.

ovaticeps Sauss., Add. prodr. Oedip., 165-166 (1888).
tenebrosa Sauss. (nec. Scudd.), Prodr. Oedip., 68-69 (1884).
Colorado.

simplex Scudd., Proc. Bost. soc. nat. hist., xvii, 514 (1875).
Nebraska to Texas.

sulphurea Fabr., Spec. ins., i, 369 (1781)—Gryllus.
Gmel., Linn. syst. nat., i, pt. 4, 2079 (1788)—Gryllus (Locusta).
Oliv., Encycl. méth., vi, 227 (1791)—Acridium.
Harr., Hitchc., Rep. geol. Mass., 583 (1833)—Locusta.
Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Oedipoda).
Thom., Rep. U. S. geol. surv. terr., v, 105 (1873)—Tomonotus.
Stål, Rec. Orth., i, 119 (1873).
U. S. and Canada, east of Rocky Mts.

tenebrosa Scudd., Rep. U. S. geol. surv. Nebr., 251 (1871)—Oedipoda.
Thom., Rep. U. S. geol. surv. terr., v, 107 (1873)—Tomonotus.
Scudd., Daws., Rep. geol. 40th par., 344 (1875).
Caulf., Can. rec. sc., ii, 400 (1887)—Oedipoda (Arphia).
pseudonictana Thom., Proc. acad. nat. sc. Philad., 1870, 82 (1870)—Tomonotus.
mexicana Thom. (nec. Sausss.), Ibid., 1870, 82 (1870)—Tomonotus.
sanguinaria Stål, Rec. Orth., i, 119 (1873).
U. S. and Canada west of Mississippi River.

teporata Scudd., Ann. rep. chief eng., 1876, 508 (1876).
Rocky Mt. region, Texas.

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xanthoptera Germ., Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Oedipoda).
Thom., Rep. U. S. geol. surv. terr., v, 105 (1873)—Tomonotus.
Scudd., Hitchc., Rep. geol. N. H., i, 377 (1874).
sulphurea Stoll' (nec Fabr.), Répr. spectr., Saut. pass., 13, reg., 12, pl. 6b, fig. 17 (1787-1813)—Gryllus (Locusta).
U. S. east of Great Plains except southernmost states.

CHORTOPHAGA Saussure.

brevipennis Scudd., Proc. Bost. soc. nat. hist., xvii, 483 (1875)—Tragocephala.
Scudd., Ann. rep. chief eng., 1876, 508 (1876)—Chimarocephala.
Sauss., Prodr. Oedip., 73 (1884).
California.

viridifasciata De Geer, Mém., iii, 498, pl. 42, fig. 6 (1773)—Acrydium.
Goeze, Ent. beytr., ii, 115 (1778)—Gryllus (Locusta).
Harr., Hitchc., Rep. geol. Mass., 583 (1833)—Locusta.
Harr., Ins. inj. veg., 147 (1841)—Locusta (Tragocephala).
Uhl., Harr., Ibid., 3d ed., 181 (1862)—Gomphocerus.
Scudd., Bost. journ. nat. hist., vii, 461 (1862)—Tragocephala.
Scudd., Ann. rep. chief eng., 1876, 508 (1876)—Chimarocephala.
Sauss., Prodr. Oedip., 72-73, pl., figs. 7, 12 (1884).
virginiana Fabr., Syst. ent., 291 (1775)—Gryllus.
chrysomelas Gmel., Linn. syst. nat., i, pt. 4, 2086 (1788)—Gryllus (Locusta).
marginata Oliv., Encycl. méth., vi, 229 (1791)—Acridium.
hemiptera Palis., Ins. Afr. Amér., 145, pl. 4, fig. 3 (1817)—Acridium.
radiata Harr., Cat. ins. Mass., 56 (1835)—Locusta.
infuscata Harr., Ins. inj. veg., 147 (1841)—Locusta (Tragocephala).
zimmermanni Sauss., Rev. mag. zool., 1861, 320 (1861)—Tomonotus.
doranii Gcd., Ent. amer., vi, 13-14 (1890)—Stethophyma.
viridis Osb., Ins. life, v, 323 (1893)—Tragocephala.
U. S. and Canada, east of Rocky Mts.

CHIMAROCEPHALA Scudder.

behrensi Sauss., Prodr. Oed., 75 (1884).
California.

pacifica Thom., Rep. U. S. geol. surv. terr., v, 101 (1873)—Tragocephala.
Scudd., Ann. rep. chief eng., 1876, 508 (1876).
California.

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ENCOPTOLOPHUS Scudder.

costalis Scudd., Bost. journ. nat. hist., vii, 473 (1862)—Oedipoda.
Stål, Rec. Orth., i, 119 (1873)—Tragocephala.
Scudd., Proc. Bost. soc. nat. hist., xvii, 480 (1875).
Texas, New Mexico, Missouri.

pallidus Brun., N. A. fauna, vii, 266 (1893).
California.

parvus Scudd., Proc. Bost. soc. nat. hist., xvii, 480 (1875).
Texas.

sordidus Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Oedipoda).
Stål, Rec. Orth., i, 119 (1873)—Tragocephala.
Scudd., Proc. Bost. soc. nat. hist., xvii, 479 (1875).
Prov., Faune ent. Can., ii, 41 (1877)—Oedipoda (Encoptolophus).
Osb., Bull. div. ent. U. S. dep. agric., xxiii, 59 (1891)—Arphia.
periscelidis Say, Harr., Cat. ins. Mass., 56 (1835)—Locusta [undescribed].
nebulosus Harr., Ins. inj. veg., 146 (1841)—Locusta.
U. S. and Canada east of Great Plains.

CAMNULA Stål.

pellucida Scudd., Bost. journ. nat. hist., vii, 472 (1862)—Oedipoda.
Scudd., Hitchc., Rep. geol. N. H., i, 378 (1874).
Prov., Faune ent. Can., ii, 40 (1877)—Oedipoda (Camnula).
obiona Thom., Ann. rep. U. S. geol. surv. terr., ii, 266, 279 (1871)—Stenobothrus.
atrox Scudd., Rep. U. S. geol. surv. Nebr., 253 (1872)—Oedipoda.
tricarinata Stål, Rec. Orth., i, 120 (1873).
Northernmost U. S. and Canada from Atlantic to Pacific.

HIPPISCUS Saussure.

(Hippiscus.)

compactus Scudd., Psyche, vi, 268, 288 (1892).
Maryland, N. Carolina.

haldemanii Scudd., Rep. U. S. geol. surv. Nebr., 251 (1871)—Oedipoda.
Scudd., Bull. U. S. geol. surv. terr., ii, 264 (1876).
paradoxus Glov. (nec Thom.), Ill. N. A. ent., Orth., pl. 18, fig. 14 (1874)—Oedipoda.

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nanus Sauss., Prodr. Oedip., 86-87 (1884).
tuberculatus McNeill (nec Palis.), Psyche, vi, 63 (1891).
neglectus Thom., Key Ill. Orth., 3 (1875)—Oedipoda.
Central U. S.

pantherinus Scudd., Psyche, vi, 267, 285-286 (1892).
Texas.

phoenicopterus Germ., Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
Haan, Bijdr. kenn. Orth., 144 (1842)—Acridium (Oedipoda).
Sauss., Prodr. Oedip., 87 (1884).
discoideus Serv., Orth., 724 (1839)—Oedipoda.
Southern U. S. east of Great Plains.

rugosus Scudd., Bost. journ. nat. hist., vii, 469 (1862)—Oedipoda.
Scudd., Hitchc., Rep. geol. N. H., i, 377 (1874).
U. S. east of Rocky Mts.

saussurei Scudd., Psyche, vi, 268, 302 (1892).
haldemanii Thom. (nec Scudd.), Ann. rep. U. S. geol. surv. terr., v, 456 (1872)—Oedipoda.
Texas.

suturalis Scudd., Psyche, vi, 268, 301-302 (1892).
rugosus McNeill (nec Scudd.), Psyche, vi, 63 (1891).
Illinois.

texanus Scudd., Psyche, vi, 267, 286-287 (1892).
Texas.

tuberculatus Palis., Ins. Afr. Amér., 145, pl. 4, fig. 1 (1817)—Acridium.
Harr., Cat. ins. Mass., 56 (1835)—Locusta.
Sauss., Prodr. Oedip., 87-88 (1884).
apiculatus Say, Harr., Cat. ins. Mass., 56 (1835)—Locusta.
obliteratus Germ., Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
corallinus Harr., Ins. inj. veg., 142 (1842)—Locusta.
phoenicopterus Scudd. (nec Germ.), Bost. journ. nat. hist., vii, 468-469 (1862)—Oedipoda.
N. America east of the Rocky Mts., rare southwardly.

variegatus Scudd., Psyche, vi, 268, 301 (1892).
Central U. S. east of Great Plains.

(Sticthippus.)

californicus Scudd., Psyche, vi, 269, 317-318 (1892).
California.

marmoratus Scudd., Psyche, vi, 269, 318 (1892).
California.

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HIPPISCUS (Continued).

(Xanthippus.)

affrictus Scudd., Psyche, vi, 272, 336, 347 (1892).
Dakota, Nevada, Colorado, Arizona.

albulus Scudd., Psyche, vi, 273, 350, 359 (1892).
Arizona.

altivolus Scudd., Psyche, vi, 272, 347-348 (1892).
Mountains of Colorado.

aurilegulus Scudd., Psyche, vi, 274, 362-363 (1892).
California.

calthulus Sauss., Prodr. Oedip., 93 (1884)—Xanthippus.
Scudd., Psyche, vi, 274, 361-362 (1892).
Nevada, California.

conspicuus Scudd., Psyche, vi, 271, 319-320 (1892).
Kansas, New Mexico.

corallipes Hald., Stansb., Expl. Utah, 371, pl. 10, fig. 2 (1852)—Oedipoda.
Scudd., Bull. U. S. geol. surv. terr., ii, 264 (1876)—Hippiscus.
Sauss., Prodr. Oedip., 90 (1884)—Xanthippus.
Scudd., Psyche, vi, 270, 318-319 (1892).
Great Plains and Rocky Mt. region.

cupidus Scudd., Psyche, vi, 272, 348-349 (1892).
Arizona.

eremitus Scudd., Psyche, vi, 271, 320, 333 (1892).
Arizona.

griseus Scudd., Psyche, vi, 274, 362 (1892).
Utah.

lateritius Sauss., Prodr. Oedip., 92-93 (1884)—Xanthippus.
Scudd., Psyche, vi, 274, 361 (1892).
Riley, N. A. fauna, vii, 251 (1893)—Hippiscus.
Nevada, California.

latifasciatus Scudd., Psyche, vi, 273, 359 (1892).
Manitoba, Alberta, Dakota.

leprosus Sauss., Prodr. Oedip., 92 (1884)—Xanthippus.
Scudd., Psyche, vi, 271, 334 (1892).
Montana, Nevada, New Mexico.

maculatus Scudd., Psyche, vi, 271, 333-334 (1892).
Colorado, Arizona.

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montanus Thom., Ann. rep. U. S. geol. surv. terr., v, 462 (1872)—Oedipoda.
Brun., Can. ent., xvii, 12 (1885)—Hippiscus.
Scudd., Psyche, vi, 273, 361 (1892).
Idaho, Montana, Nebraska, New Mexico, Arizona.

neglectus Thom., Proc. acad. nat. sc. Philad., 1870, 81-82 (1870)—Oedipoda.
Thom., Proc. Dav. acad. nat. sc., i, 254 (1876)—Arphia.
Scudd., Bull. U. S. geol. surv. terr., ii, 264 (1876)—Hippiscus.
Sauss., Prodr. Oedip., 94-95 (1884)—Xanthippus.
Scudd., Psyche, vi., 273, 360-361 (1892).

putnami Thom., Proc. Dav. acad. nat. sc., i, 257, pl. 36, fig. 6 (1876)—Cratypedes

lineatus Scudd., Proc. Bost. soc. nat. hist., xix, 31 (1877)—Hippiscus.
Rocky Mt region and Interior Basin.

obscurus Scudd., Psyche, vi, 273, 359-360 (1892).
British Columbia.

paradoxus Thom., Ann. rep. U. S. geol. surv. terr., v, 457 (1872)—Oedipoda.
Scudd., Psyche, vi, 271, 335-336 (1892).
Idaho and Nebraska to Arizona and New Mexico.

pardalinus Sauss., Rev. mag. zool., 1861, 324 (1861)—Oedipoda.
Sauss., Prodr. Oedip., 90-91 (1884)—Xanthippus.
Scudd., Psyche, vi, 271, 333 (1892).
California, Nevada, Utah, New Mexico.

pumilus Scudd., Psyche, vi, 272, 349-350 (1892).
Colorado, New Mexico, Arizona.

stigmosus Scudd., Psyche, vi, 274, 363 (1892).
California, Nevada.

tigrinus Scudd., Psyche, vi, 271, 334 (1892).
Nebraska, Colorado, Arizona.

toltecus Sauss., Prodr. Oedip., 91-92 (1884)—Xanthippus.
Scudd., Psyche, vi, 272, 347 (1892).
Montana, Wyoming, Utah.

vitellinus Sauss., Prodr. Oedip., 94 (1884)—Xanthippus.
Scudd., Psyche, vi, 274, 362 (1892).
Oregon, Nevada, Idaho.

zapotecus Sauss., Prodr. Oedip., 91 (1884)—Xanthippus.
Scudd., Psyche, vi, 270, 319 (1892).
Iowa to New Mexico and California.

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LEPRUS Saussure.

corpulentus Sauss., Prodr. Oedip., 96 (1884).
Texas.

intermedius Sauss., Prodr. Oedip., 96 (1884).
California.

wheeleri Thom., Rep. U. S. geol. surv. west 100 mer., v, 879, pl. 44, fig. 1 (1875)—Oedipoda.
Brun., Bull. Washb. coll., i, 133 (1885)—Picnodictya.
Sauss., Add. prodr. Oedip., 169 (1888).
Colorado, Utah, New Mexico.

AGYMNASTUS Scudder.

ingens Scudd., Proc. Bost. soc. nat. hist., xix, 32 (1877)—Leprus.
Scudd., Can. ent., xxix, 75 (1897).
California.

TROPIDOLOPHUS Thomas.

formosus Say, Amer. ent., iii, pl. 34 (1828) - Gryllus.
Thom., Rep. U. S. geol. surv. terr., v, 138, pl., fig. 1 (1873).
Wyoming to Kansas and New Mexico.

DISSOSTEIRA Scudder.

carolina Linn., Syst. nat., 10 ed., i, 433 (1758) - Gryllus (Locusta).
De Geer, Mém., iii, 491, pl. 47, fig. 2, 3 (1773)—Acrydium.
Fabr., Syst. ent., 291 (1775)—Gryllus.
Harr., Hitchc., Rep. geol. Mass., 583 (1833)—Locusta.
Burm., Handb. ent., ii, 643 (1838)—Oedipoda.
Scudd., Proc. Bost. soc. nat. hist., xix, 89 (1877).
Prov., Faune ent. Can., ii, 39 (1877)—Oedipoda (Dissosteira).
Caulf., Can. Orth., 12, 13 (1887)—Oedipoda (Hippiscus).
Towns., Proc. ent. soc. Wash., i, 266-267 (1890) — Dissosteira (Oedipoda).
caroliniana Catesby, Carol., ii, 89, pl. 89 (1743)—Locusta.
U. S. and Canada, ocean to ocean.

longipennis Thom., Ann. rep. U. S. geol. surv. terr., v, 463 (1872) —Oedipoda.
Scudd., Ann. rep. chief eng., 1876, 511 (1876).
Riley, Stand. nat. hist., ii, 202 (1884)—Oedipoda (Dissosteira).
nebrascensis Brun., Can. ent., viii, 123 (1876)—Oedipoda.
Idaho and Montana to New Mexico and Texas.

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spurcata Sauss., Prodr. Oedip., 137 (1884).
obliterata Thom. (nec Germ.), Can. ent., xii, 221-222 (1880)—Oedipoda.
California, Oregon.

utahensis Thom., Rep. U. S. geol. surv. west 100 mer., v, 883, pl. 44, fig. 2, (1875)—Oedipoda.
Sauss., Add. prodr. Oedip., 167 (1888).
Utah.

SPHARAGEMON Scudder.

aequale Say, Journ. acad. nat. sc. Philad., iv, 307 (1825)—Gryllus.
Harr., Cat. ins. Mass., 56 (1835)—Locusta.
Uhl., Harr., Ins. inj. veg., 3 ed., 178 (1862)—Oedipoda.
Scudd., Hitchc , Rep. geol. N. H., i, 377 (1874)—Trimerotropis.
Scudd., Proc. Bost. soc. nat. hist., xvii, 468 (1875).
Sauss., Prodr. Oedip., 139-140 (1884)—Dissosteira (Spharagemon).
?helfragei Stal, Rec. Orth., i, 129 (1873)—Oedipoda.
U. S. and Canada from Rocky Mts. eastward.

bolli Scudd., Proc. Bost. soc. nat hist., xvii, 469 (1875).
Sauss., Prodr. Oedip., 140 (1884)—Dissosteira (Spharagemon).
balteatum Scudd., Proc. Bost. soc. nat. hist., xvii, 469 (1875).
Massachusetts to Georgia, Texas and Nebraska.

collare Scudd., Rep. U. S. geol. surv. Nebr., 250 (1871)—Oedipoda.
Scudd., Proc. Bost. soc. nat. hist., xvii, 470 (1875).
Sauss., Prodr. Oedip., 139 (1884)—Dissosteira (Spharagemon).
Northern U. S. and Canada from Rocky Mts. eastward.

cristatum Scudd., Proc. Bost. soc. nat hist., xvii, 470 (1875).
Sauss., Prodr. Oedip., 138-139 (1884)—Dissosteira (Spharagemon).
Brun., Publ. Nebr. acad. sc., iii, 24 (1893)—Arphia.
Texas, Nebraska.

oculatum Morse, Proc. Bost. soc. nat. hist., xxvi, 232-234, 237-240, fig. 8 (1894).
New Jersey, Indiana.

saxatile Morse, Proc. Bost. soc. nat. hist., xxvi, 229-232, 235-236, 238-239, fig. 4, 5 (1894).
New England to Maryland.

texense Sauss., Prodr. Oedip., 140 (1884)—Dissosteira (Spharagemon).
Texas

venustum Stal, Orth. Eug. resa., 344 (1861)—Oedipoda.
Sauss., Prodr. Oedip., 138 (1884)—Dissosteira (Spharagemon).
California, Oregon.

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SPHARAGEMON (Continued).

wyomingianum Thom., Ann. rep. U. S. geol. surv. terr., v, 462 (1872)—Oedipoda.
Scudd., Proc. Bost. soc. nat. hist., xvii, 470 (1875).
wyomingense Blatchl., Orth. Ind., 2 (1897)
Wyoming, Indiana.

SCIRTETICA Saussure.

marmorata Harr., Ins. inj. veg., 145 (1841)—Locusta.
Uhl., Harr., Ibid., 3 ed., 179 (1862)—Oedipoda.
Sauss., Prodr. Oedip., 141 (1884)—Dissosteira (Scirtetica).
Davis, Ent. amer., v, 81 (1889)—Psinidia.
Smith, Cat. ins. N. J., 415 (1890).
cerincipennis Harr., Cat. ins. Mass., 56 (1835)—Lactista—undescribed.
North Atlantic coast, Ontario, Texas

occidentalis Brun., N. A. fauna, vii, 267 (1893).
California.

picta Scudd., Proc. Bost. soc. nat. hist., xix, 31, 90 (1877)—Trimerotropis.
Sauss., Prodr. Oedip., 141-142 (1884)—Dissosteira (Scirtetica).
Georgia, Florida.

LACTISTA Saussure.

gibbosus Sauss., Prodr. Oedip., 143 (1884).
California.

TOMONOTUS Saussure.

aztecus Sauss., Rev. mag. zool., 1861, 397 (1861)—Oedipoda.
Sauss., Prodr. Oedip., 99 (1884).
Texas.

orizabae Sauss., Prodr. Oedip., 98 (1884).
mexicanus Sauss., Rev. mag. zool., 1861, 397 (1861)—Oedipoda.
[not *Tom. mex.* Sauss., Ibid, 1861, 321.]
Texas.

theresiae Brunn., Berl. ent. zeitschr., xl, 277 (1895).
N. Dakota.

DEROTMEMA Scudder.

cupidineum Scudd., Ann. rep. chief. eng., 1876, 513 (1876).
New Mexico.

haydeni Thom., Rep. U. S. geol. surv. terr., v, 460 (1871)—Oedipoda.
Brun., Ann. rep. Nebr. bd. agric., 1896, 132 (1897).

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brunnerianum Sauss., Prodr. Oedip., 155-156 (1884).
Nebraska, Colorado, Wyoming.

rileyanum Sauss., Prodr. Oedip., 156 (1884).
Idaho.

MESTOBREGMA Scudder.

asperum Scudd., Ann. rep. chief eng., 1876, 512 (1876) Trachyrachis.
New Mexico.

boreale Sauss., Prodr. Oedip., 164 (1884)—Psinidia (Trachyrachis).
Sauss., Add. prodr. Oedip., 59 (1888)—Trachyrachis.
Colorado.

capito Stål, Rec. Orth., i, 133 (1873)—Psinidia.
Sauss., Prodr. Oedip., 163 (1884)—Psinidia (Trachyrachis).
Sauss., Add. prodr. Oedip., 58 (1888)—Trachyrachis.
Texas.

cinctum Thom., Proc. acad. nat. sc. Philad., 1870, 80 (1870)—Oedipoda.
Thom., Bull. Ill. mus. nat. hist., i, 65 (1876).
Brun., Publ. Nebr. acad. sc., iii, 25 (1893)—Trachyrachis.
Upper Mississippi valley, Colorado.

coronatum Scudd., Ann. rep. chief eng., 1876, 512 (1876)—Trachyrachys.
New Mexico.

fuscifrons Stål, Rec. Orth., i, 134 (1873)—Psinidia.
Sauss., Prodr. Oedip., 163 (1884)—Psinidia (Trachyrachis).
Sauss., Add. Prodr. Oedip., 58 (1888)—Trachyrachis.
Texas.

kiowa Thom., Ann. rep. U.S. geol. surv. terr., v, 461 (1872)—Oedipoda.
Thom., Rep. U.S. geol. surv. west 100 mer., v, 885 (1875)—Psinidia.
Thom., Proc. Dav. acad. nat. sc., i, 256 (1876).
Sauss., Prodr. Oedip., 164 (1884)—Psinidia (Trachyrachis).
Sauss., Add. prodr. Oedip., 59, 168 (1888)—Trachyrachis.
Dakota and Montana to Nebraska and Utah.

maculosum Sauss., Prodr. Oedip., 162-163 (1884)—Psinidia (Trachyrachis.
Sauss., Add. prodr. Oedip., 58, 59 (1888)—Trachyrachis.
Alberta.

mexicánum Sauss., Prodr. Oedip., 164 (1884)—Psinidia (Trachyrachys.

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MESTOBREGMA (Continued).

Sauss., Add. prodr. Oedip. 59, (1888)—Trachyrachys.
Western Nebraska.

pardalinum Sauss., Rev. mag. zool., 1861, 324 (1861) –Oedipoda.
Sauss , Prodr. Oedip., 162 (1884)—Psinidia (Trachyrachis).
Sauss., Add. prodr. Oedip., 58, 59 (1888)—Trachyrachis.

MESTOBREGMA (Continued).

Brun., Ann. rep. Nebr. bd. agric., 1896, 132 (1897).
Nebraska, Colorado.

plattei Thom., Rep. U. S. geol. surv. terr., v, 123 (1873)—Oedipoda.
Scudd., Bull. U. S. geol. surv. terr., ii, 264 (1876).
Sauss., Add. prodr. Oedip., 170-171 (1888)—Trachyrachis.
Brun., Ann. rep. Nebr. bd. agric., 1896, 132 (1897) –Psinidia.
Wyoming, Colorado, Nebraska, Kansas.

PSINIDIA Stål.

fenestralis Serv., Orth., 726 (1839)—Oedipoda.
Stål., Rec. Orth., i, 133 (1873).
cucerata Harr., Hitchc., Rep. geol. Mass., 583 (1833)—Locusta—undescribed.
Harr., Ins. inj. veg., 145 (1841)—Locusta.
U. S. and Canada east of Mississippi River.

CONOZOA Saussure.

albolineata Brun., Proc. U. S. nat. mus., xii, 66-67 (1890).
California.

behrensi Sauss., Prodr. Oedip., 165 (1884).
California.

koebelei Brun., Proc. U. S. nat. mus., xii, 67-68 (1890).
California.

rebellis Sauss., Add. prodr. Oedip., 60, 61 (1888).
California.

rogenhoferi Sauss., Add. prodr. Oedip., 62, pl., figs. 4, 4ab (1888).
"Bagdad" [California?]

sulcifrons Scudd., Ann. rep. chief eng., 1876, 513 (1876)—Psinidia.
Sauss., Prodr. Oedip., 166 (1884).
California, Arizona.

texana Brun., Proc. U. S. nat. mus., xii, 65-66 (1890).
Texas.

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wallula Scudd., Rep. U. S. ent. comm., ii, app., 27-28, pl. 17, figs. 13, 14 (1881)—Psinidia.
Sauss., Prodr. Oedip., 166 (1884).
Washington to California and Montana.

TRIMEROTROPIS Stål.

azurescens Brun., Proc. U. S. nat. mus., xii, 69-70 (1890).
Idaho, Montana, Wyoming.

bifasciata Brun., Proc. U. S. nat. mus., xii, 70-71 (1890).
California.

caeruleipennis Brun., Can. ent., xvii, 10-12 (1885).
Washington to Wyoming and Arizona.

caeruleipes Scudd., Rep. U. S. ent. comm., ii, app., 27 (1881).
Oregon, California.

californica Brun., Proc. U. S. nat. mus., xii, 71 (1890).
California.

cincta Thom., Proc. acad. nat. sc. Philad., 1870, 80 (1870)—Oedipoda.
Sauss , Prodr. Oedip., 171-172 (1884).
Brun., Publ. Nebr. acad. sc., iii, 25 (1893)—Trachyrachis.
Illinois to New Mexico, California.

citrina Scudd., Bull. U. S. geol. surv. terr., ii, 265 (1876).
Manitoba to Texas.

cyanipennis Brun., Proc. U. S. nat. mus., xii, 68-69 (1890).
Utah.

fallax Sauss., Prodr. Oedip., 170 (1884).
California.

fontana Thom., Proc. Dav. acad. nat. sc., i, 255, pl. 36, fig. 5 (1876).
Utah, Yellowstone.

gracilis Thom., Ann. rep. U. S. geol. surv. terr., v, 461 (1871)—Oedipoda.
Sauss., Prodr. Oedip., 171 (1884).
Brun., Publ. Nebr. acad. sc., iii, 25 (1893)—Conozoa.
Idaho and Dakota to Colorado and Nebraska.

juliana Scudd., Ann. rep. chief eng., 1876, 514 (1876).
California.

laticincta Sauss., Prodr. Oedip., 169-170 (1884).
Texas, Colorado.

latifasciata Scudd., Rep. U. S. ent. comm., ii, app., 26-27 (1881).
Washington to Utah.

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TRIMEROTROPIS (Continued).

maritima Harr., Ins. inj. veg., 143 (1841)—Locusta.
Uhl., Harr., Ibid., 3 ed., 178 (1862)—Oedipoda.
Stål, Rec. Orth., i, 135 (1873).
Atlantic coast from New Hampshire to Georgia and Great Lakes.

modesta Brun., Proc. U. S. nat. mus., xii, 72 (1890).
New Mexico.

monticola Sauss., Prodr. Oedip., 170 (1884).
New Mexico.

obscura Scudd., Ann. rep. chief eng., 1876, 514 (1876).
New Mexico.

pacifica Brun., Proc. U. S. nat. mus., xii, 73-74 (1890).
California.

perplexa Brun., Proc. U. S. nat. mus., xii, 74-75 (1890).
Nebraska.

pistrinaria Sauss., Prodr. Oedip., 173 (1884).
Texas.

pseudofasciata Scudd., Ann. rep. chief eng., 1876, 514 (1876).
California and Washington to Colorado.

similis Scudd., Rep. U. S. ent. comm., ii, app., 27 (1881).
Washington.

thalassica Brun., Proc. U. S. nat. mus., xii, 72-73 (1890).
California.

vinculata Scudd., Proc. Bost. soc. nat. hist., xviii, 270 (1876).
California and Victoria to Nebraska.

CIRCOTETTIX Scudder.

carlinianus Thom., Proc. acad. nat. sc. Philad., 1870, 81 (1870)—Oedipoda.
Thom., Proc. Dav. acad. nat. sc., i, 254 (1876).
Riley, Stand. nat. hist., ii, 202-203 (1884) —Oedipoda (Circotettix).
Colorado to Nevada, northward.

lapidicola Brun., Proc. U. S. nat. mus., xii, 75-76 (1890).
Idaho.

lobatus Sauss., Add. prodr. Oedip., 65-66, pl., fig. 5 (1888).
Colorado.

maculatus Scudd., Rep. U. S. ent. comm., ii, app., 26, pl. 17, fig 10 (1881).
Sierra Nevadas.

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?occidentalis Brun., Proc. U. S. nat. mus., xii, 77-78, pl. 1, fig. 7 (1890)—Oedipoda.
California.

shastanus Brun., Proc. U. S. nat. mus., xii, 76-77 (1890).
California.

sparsus Thom., Rep. U. S. geol. surv. west 100 mer., v, 883, pl. 45, fig. 6 (1875)—Oedipoda.
Sauss., Add. prodr. Oedip., 172-173 (1888).
New Mexico.

suffusus Scudd., Bull. U. S. geol. surv. terr., ii, 265 (1876)—Trimerotropis.
Scudd., Appal., viii, 308-309 (1898).
Northern U. S. west of Rocky Mts.

thallassinus Sauss., Prodr. Oedip., 177-178 (1884).
Nevada.

undulatus Thom., Ann. rep. U. S. geol. surv. terr., v, 460 (1871)—Oedipoda.
Scudd., Bull. U. S. geol. surv. terr., ii, 265 (1876).
Rocky Mt. region to Pacific north of Lat. 40°.

verruculatus Kirb., Faun. bor. amer., iv, 250 (1837)—Locusta.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Locusta).
Scudd., Can. nat., vii, 287 (1862)—Oedipoda.
Scudd., Hitchc., Rep. geol. N. H., i, 377, fig. 57 (1874)—Trimerotropis.
Prov., Faune ent. Can., ii, 40 (1877)—Oedipoda (Trimerotropis).
Sauss., Prodr. Oedip., 175-176 (1884).
latipennis Harr., Ins. inj. veg., 144 (1841)—Locusta.
Northern U. S. and Canada from Atlantic to Pacific.

HADROTETTIX Scudder.

trifasciatus Say, Amer. ent., iii, pl. 34 (1828)—Gryllus.
Walk., Cat. Derm. salt. Brit. mus., iv, 729 (1870)—Oedipoda.
Scudd., Ann. rep. chief eng., 1876, 511 (1876).
Caulf., Rep. ent. soc. Ont., xviii, 70 (1888)—Arphia.
pruinosus Thom., Proc. acad. nat. sc. Philad., 1870, 80 (1870)—Oedipoda.
hoffmanii Thom., Rep. U. S. geol. surv. terr., v, 127 (1873)—Oedipoda.
Rocky Mt. region.

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ANCONIA Scudder.

integra Scudd., Ann. rep. chief eng., 1876, 515 (1876).
California.

HELIASTUS Saussure.

aridus Brun., Proc. U. S. nat. mus., xii, 78-79, pl. 1, figs. 2, 3 (1890)—Thrincus.
Scudd., Can. ent., xxix, 75 (1897).
New Mexico, California.

californicus Thom., Bull. U. S. geol. surv. terr., i, no. 2, ser. 1, 66 (1874)—Thrincus.
Scudd., Can. ent., xxix, 75 (1897).
California.

Eremobiini.

BRACHYSTOLA Scudder.

magna Gir., Marcy, Expl. Red River, 260, pl. 15, fig. 1-4 (1853)—Brachypeplus.
Scudd., Bull. U. S. geol. surv. terr., ii, 267 (1876).
Rocky Mts. to Mississippi River.

virescens Charp., Orth. descr., pl. 51 (1841-1845)—Brachypeplus.
Brun., Rep. U. S. ent. comm., iii, 58 (1883).
Texas.

TYTTHOTYLE Scudder.

maculata Brun., Proc. U. S. nat. mus., xii, 79-80 (1890)—Thrincus.
Scudd., Can. ent., xxix, 75 (1897).
Extreme southwestern U. S.

HALDEMANELLA Saussure.

robusta Brun., Proc. U. S. nat. mus., xii, 81-82 (1890).
Arizona.

tschivavensis Hald., Stansb., Expl. Utah, 371, pl. 10, fig. 3 (1852)—Ephippigera.
Sauss., Add. prodr. Oedip., 153-154 (1888).
verruculata Uhl., Glov., Ill. N. A. ent., Orth., pl. 6, fig. 25 (1872)—Phrynotettix.
magna Thom., Rep. U. S. geol. surv. west 100 mer., v, 886, pl. 43, fig. 5 (1875)—Eremobia.
Utah to Texas.

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ACRIDIINAE.

Tropidonoti.

DRACOTETTIX Bruner.

monstrosus Brun., Proc. U. S. nat. mus. xii, 50-51, pl. 1, fig. 1 (1890).
California.

plutonius Brun., N. A. fauna, vii, 267-268 (1893).
California.

Taeniopodae.

DICTYOPHORUS Thunberg.

marci Serv., Orth., 623 (1839)—R[h]omalea.
Brun., Rep. U. S. ent. comm., iii, 58 (1883).
Southern states.

reticulatus Thunb., Mém. acad. St. Petersb., v, 259 (1815).
micropterus Palis., Ins. Afr. Amér., 146, pl. 4, fig. 4 (1817)—Acridium.
giganteus Burm., Handb. ent., ii, 619 (1838)—Rhomalea.
centurio (pars) Burm. (nec Drury), Ibid., ii, 620 (1838)—Rhomalea.
Southern U. S.

Rhomaleae.

RHOMALEA Burmeister.

colorata Serv., Orth., 674 (1839)—Acridium.
Walk., Cat. Derm. salt. Brit. mus., iv, 644 (1870)—Chromacris.
Stål, Rec. Orth., i, 51 (1873).
pedes Sauss., Rev. mag. zool., 1859, 392 (1859).
S. Carolina, Texas.

Tropidacres.

TROPIDACRIS Scudder.

dux Drury, Ill. nat. hist., ii, 82, pl. 44 (1773)—Gryllus (Locusta).
Oliv., Encycl. méth., vi, 215, pl. 126, fig. 1 (1791)—Acridium.
Westw., Drury, Ins., ii, 92, pl. 44 (1837)—Locusta (Rutioderes).
Dunc., Intr. ent., 257, pl. 15, fig. 2 (1840)—Locusta.
Scudd., Proc. Bost. soc. nat. hist., xii, 347 (1869).
latreillei Perty, Delect. anim. artic., 123, pl. 24, fig. 4 (1834)—Acridium.
cristata Thunb. (nec Linn.), Mém. acad. St. Petersb., v, 224 (1815)—Gryllus.
Texas.

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Mesopes.

PSEUDOPOMALA Morse.

aptera Scudd., Trans. amer. ent. soc., ii, 305 (1869)—Opomala.
McNeill, Proc. Dav. acad. nat. sc., vi, 209 (1897).
Pennsylvania.

brachyptera Scudd., Bost. journ. nat. hist., vii, 454 (1862) —Opomala.
Osb., Proc. Iowa acad. sc., i, pt. 2, 118 (1892)—Mermiria.
Brun., Publ. Nebr. acad. sc., iii, 23 (1893)—Stetheophyma.
Morse, Psyche, vii, 325, 343-344, 382, pl. 7, fig. 6, 6ab (1896).
Northern U. S. east of Rocky Mts.

PAROPOMALA Scudder.

calamus Scudd., Psyche, viii, 437 (1899).
California.

cylindrica Brun., Proc. U. S. nat. mus., xii, 48-49 (1890)—Mesops.
Scudd., Psyche, viii, 437 (1899).
Nebraska, Colorado.

virgata Scudd., Psyche, viii, 437 (1899).
California to New Mexico.

wyomingensis Thom., Proc. acad. nat. sc. Philad., 1871, 152 (1871) —Mesops.
Thom., Ann. rep. U. S. geol. surv. terr., v, 446, pl. 2, fig. 8 (1872) —Opomala.
Scudd., Psyche, viii, 437 (1899).
Wyoming, Kansas.

Leptysmae.

ARNILIA Stål.

chlorizans Walk., Cat. Derm. salt. Brit. mus., iv, 652-653 (1870)—Stenacris.
Thom., Rep. U. S. geol. surv., v, 60 (1873)—Mesops.
Scudd., Proc. Bost. soc. nat. hist., xix, 88 (1877).
Florida.

cylindrodes Stål, Eug. resa, ins., Orth., 325 (1860)—Opomala.
Stål, Rec. Orth., i, 85 (1873).
Carolina.

mexicana Sauss., Rev. mag. zool., 1861, 156 (1861)—Opomala.
Bol., Mém. soc. zool. France, i, 146 (1888).
Ril., N. A. Fauna, vii, 252 (1893)—Leptysma.
California.

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LEPTYSMA Stål.

marginicollis Serv., Orth., 591 (1839)—Opsomala.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Opsomala).
Stål, Rec. Orth., i, 86 (1873).
Southern states east of Mississippi.

Acridia.

SCHISTOCERCA Stål.

albolineata Thom., Rep. U. S. geol. surv. west 100 mer., v, 897, pl. 43, fig. 1 (1875)—Acridium.
Scudd., Proc. amer. acad. arts sc., xxxiv, 445, 466 (1899).
Iowa and Idaho to New Mexico.

alutacea Harr., Ins. inj. veg., 139 (1841)—Acridium.
Walk., Cat. Derm. salt. Brit. mus., iv, 609 (1870)—Cyrtacanthacris.
Brun., Publ. Nebr. acad. sc., iii, 26 (1893).
emarginata Uhl., Dodge, Can. ent., iv, 15 (1871)—Acridium.
U. S. east of Sierra Nevadas, southern California.

americana Drury, Ill. nat. hist., i, 128, pl. 49, fig. 2 (1770)—Gryllus.
Scudd., Bost. journ. nat. hist., vii, 466 (1862)—Acridium.
Walk., Cat. Derm. salt. Brit. mus., iii, 550 (1870)—Cyrtacanthacris.
Stal, Rec. Orth., i, 66 (1873)—Acridium (Schistocerca).
Brun., Bull. Washb. coll., i, 136 (1885).
succincta (pars) Linn., Syst. nat., ed. xii, i, 699 (1767)—Gryllus.
rustica Fabr., Syst. ent., 292 (1775)—Gryllus.
tartarica Panz., Drury, Ins., pl. 49, fig. 2 (1785-1788)—Gryllus.
serialis Thunb., Mém. acad. St. Petersb., v, 241 (1815)—Gryllus.
vittata Palis., Ins. Afr. Amér., 146, pl. 4, fig. 5 (1817)—Acridium.
ambigua Thom., Ann. rep. U.S. geol. surv., v, 447 (1872)—Acridium.
obscura Bol. (nec Fabr.), Mém. soc. zool. France, 1888, 144 (1888).
U. S. east of Great Plains.

carinata Scudd., Proc. amer. acad. arts sc., xxxiv, 443, 449 (1899).
California.

damnifica Sauss., Rev. mag. zool., 1861, 164 (1861)—Acridium.
Scudd., Proc. amer. acad. arts sc., xxxiv, 447, 475-476 (1899).
unilineata Walk., Cat. Derm. salt. Brit. mus., iv, 611 (1870)—Cyrtacanthacris.
rubiginosa Thom. (nec Harr.), Rep. U. S. geol. surv. terr., v, 170 (1873)—Acridium.
rugosa Prov., Nat. canad., viii, 111 (1876)—Acridium.

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SCHISTOCERCA (Continued).

appendiculata Uhl., Scudd., Proc. Bost. soc. nat. hist., xix, 86 (1877) —Acridium.

From Pennsylvania and Illinois to the Gulf.

lineata Scudd., Proc. amer. acad. arts sc., xxxiv, 445, 465-466 (1899).

Kansas to Texas.

obscura Fabr., Suppl. ent. syst., 194 (1798)—Gryllus.

Burm., Handb. ent., ii, 632 (1838)—Acridium.

Scudd., Proc. amer. acad. arts sc., xxxiv, 444, 465 (1899).

olivacea Serv., Orth., 666 (1839)—Acridium.

Southern U. S., east of Rocky Mts.

rubiginosa Harr., Scudd., Bost. journ. nat. hist., vii, 467 (1862)—Acridium.

Morse, Psyche, vii, 105 (1894).

?*scutellaris* Walk., Cat. Derm. salt. Brit. mus., iii, 579 (1870)—Acridium.

U. S. east of Great Plains.

shoshone Thom., Proc. acad. nat. sc. Philad., 1873, 295 (1873)—Acridium.

Brun., Rep. Nebr. st. hort. soc., 1894, 163 (1894).

U. S. west of Rocky Mts., Texas.

vaga Scudd., Proc. Bost. soc. nat. hist., xviii, 269 (1876)—Acridium.

Brun., Proc. U. S. nat. mus., xii, 187 (1890).

California to Texas.

venusta Scudd., Proc. amer. acad. arts sc., xxxiv, 445, 467-468 (1899).

Pacific coast to Texas.

Melanopli.

GYMNOSCIRTETES Bruner.

pusillus Brun., Scudd., Rev. Mel., 15-16, pl. 2, fig. 1 (1897).

Florida.

PHAEDROTETTIX Scudder.

augustipennis Brun., Scudd., Rev. Mel., 22-23, pl. 2, fig. 7 (1897).

Texas.

CONALCAEA Scudder.

neomexicana Scudd., Rev. Mel., 24, 26, pl. 2, fig. 9 (1897).

New Mexico.

RHABDOTETTIX Scudder.

concinnus Scudd., Rev. Mel., 33-34, pl. 3, fig. 2 (1897).

Texas.

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CYCLOCERCUS Scudder.

accola Scudd., Rev. Mel., 37, 38-39, pl. 3, fig. 5 (1897).
Texas.

PARAIDEMONA Brunner.

mimica Scudd., Rev. Mel., 42, 43-44, pl. 3, fig. 10 (1897).
Texas.

punctata Stål, Bih. sv. vet.-akad. handl., v, no. 9, 11 (1878)—Pezotettix.
Brunn., Rév. syst. Orth., 145 (1893).
nuda Scudd., Proc. Bost. soc. nat. hist., xx, 77 (1879)—Pezotettix.
Texas.

HYPOCHLORA Brunner.

alba Dodge, Can. ent., viii, 10 (1876)—Pezotettix.
Brunn., Rév. syst. Orth., 145 (1893).
Manitoba to Kansas.

CAMPYLACANTHA Scudder.

acutipennis Scudd., Proc. Bost. soc. nat. hist., xvii, 472 (1875)—Pezotettix.
Brunn., Rév. syst. Orth., 145 (1893).
Kansas to Texas.

olivacea Scudd., Proc. Bost. soc. nat. hist., xvii, 472 (1875)—Pezotettix.
Scudd., Rev. Mel., 50, 51-52, pl. 4, fig. 4 (1897).
Nebraska to Texas.

vivax Scudd., Ann. rep. geol. surv. west 100 mer., 1876, 284 (1876)—Pezotettix.
Scudd., Rev. Mel., 50, 52-53, pl. 4, fig. 6 (1897).
New Mexico.

EOTETTIX Scudder.

signatus McNeill, Scudd., Rev. Mel., 54-55, pl. 4, fig. 7 (1897).
Florida.

HESPEROTETTIX Scudder.

brevipennis Thom., Bull. U. S. geol. surv. terr., i, no. 2, ser. 1, 67 (1874)—Ommatolampis.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
viridis (pars) Uhl., Bull. U. S geol. surv. terr., iii, 795 (1877).
Atlantic states.

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HESPEROTETTIX (Continued).

curtipennis Brun., Scudd., Rev. Mel , 57, 62-63 (1897).
Colorado.

festivus Scudd., Rev. Mel., 56, 60-61, pl. 4, fig. 10 (1897).
viridis Scudd. (nec Thom.), Bull. U. S. geol. surv. terr., ii, 262 (1876).
Utah to California.

pacificus Brun., Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
California.

pratensis Scudd., Rev. Mel., 57, 64-66, pl. 5, fig. 3 (1897).
viridis (pars) Thom., Rep. U. S. geol. surv. terr., v, 156 (1873)—Ommatolampis.
Mississippi River westward to California.

speciosus Scudd., Rep. U. S. geol. surv. Nebr., 250 (1871)—Pezotettix.
Brunn., Rev. syst. Orth., 145 (1893)—Hypochlora.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
frontalis Thom., Ann. rep. U. S. geol. surv. terr., v, 448, pl. 2, fig. 1 (1872)—Acridium.
Rocky Mts. to Mississippi River.

viridis Thom., Ann. rep. U. S. geol. surv. terr., v, 450, pl. 2, fig. 3 (1872)—Caloptenus.
Thom., (pars) Rep. U. S. geol. surv. terr., v, 156 (1873)—Ommatolampis.
Uhl., (pars) Bull. U. S. geol. surv. terr., iii, 795 (1877).
Stål, Bih. sv. vet.-akad. handl., v, no. 9, 14 (1878)—Pezotettix.
Nebraska to Texas and California.

AEOLOPLUS Scudder.

arizonensis Scudd., Rev. Mel., 70, 78-79, pl. 6, fig. 3 (1897).
viridis Scudd. (nec Thom.), Ann. rep. chief eng , 1876, 506 (1876)—Hesperotettix.
Arizona.

californicus Scudd., Rev. Mel., 69, 73-74, pl. 5, fig. 8 (1897).
California.

chenopodii Brun., Ins. life, vii, 41-42 (1894)—Pezotettix.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
Colorado.

elegans Scudd., Rev. Mel., 69, 71, pl. 5, fig. 6 (1897).
New Mexico.

oculatus Scudd., Rev. Mel., 70, 79-80, pl. 6, fig. 4 (1897).
Arizona.

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plagosus Scudd., Ann. rep. chief eng., 1876, 504 (1876)—Pezotettix.
Scudd., Rev. Mel., 69, 76-77, pl. 6, fig. 1 (1897).
Colorado, New Mexico.

regalis Dodge, Can. ent., viii, 11-12 (1876)—Caloptenus.
Brun., Publ. Nebr. acad. sc., iii, 28 (1893)—Melanoplus.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
Wyoming to Texas.

tenuipennis Scudd., Rev. Mel., 69, 70-71, pl. 5, fig. 5 (1897).
Arizona.

turnbulli Brun., Ann. rep. U. S. geol. surv. terr., v, 452, pl. 2, fig. 10 (1872)—Caloptenus.
Brun., Bull. Washb. coll., i, 138 (1885)—Melanoplus.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
Montana to New Mexico.

uniformis Scudd., Rev. Mel., 70, 77-78, pl. 6, fig. 2 (1897).
Arizona, Nevada.

BRADYNOTES Scudder.

caurus Scudd., Rev. Mel., 81, 83-84, pl. 6, fig. 6 (1897).
opima Brun. (nec Scudd.), Can. ent., xvii, 15 (1885).
Washington, Oregon.

expleta Scudd., Rev. Mel., 81, 84-85, pl. 6, fig. 7 (1897).
Washington.

hispida Brun., Can. ent., xvii, 12-14 (1885)—Pezotettix.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
Washington.

obesa Thom., Ann. rep. U. S. geol. surv. terr., v, 454-455, pl. 2, fig. 13-14 (1872)—Pezotettix.
Scudd., Can. ent., 12, 75-76 (1880).
opima Scudd., Rep. U. S. ent. comm., ii, app., 24 (1881).
Wyoming to California.

pinguis Scudd., Rev. Mel., 81, 85-87, pl. 6, fig. 8 (1897).
Washington, Nevada.

referta Scudd., Rev. Mel., 81, 88-89, pl. 6, fig. 10 (1897).
Idaho to California.

satur Scudd., Rev. Mel., 81, 89-91, pl. 7, fig. 1 (1897).
California.

DENDROTETTIX Riley.

quercus Ril., Pack., Rep. U. S. ent. comm., v, 214-215 (1890).
longipennis Ril., Ins. life, v, 255 (1893).
Iowa to Texas.

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PODISMA Latreille.

ascensor Scudd., Rev. Mel., 98, 107-108, pl. 7, fig. 8 (1897).
dodgei Scudd. (nec Thom.), Bull. U. S. geol. surv. terr., ii, 261 (1876) —Pezotettix.
Utah.

dodgei Thom., Can. ent., iii, 168 (1871)—Caloptenus.
Thom., Rep. U. S. geol. surv. terr., v, 153 (1873)—Pezotettix.
Scudd., Rep. ent. soc. Ont., xxvi, 63, 66 (1896).
bohemani Stål, Bih. sv. vet.-akad. handl., v, no. 9, 15 (1878) —Pezotettix.
marshallii Scudd. (nec Thom.), Appal., i, 263 (1878)—Pezottetix.
aspirans Scudd., Proc. Bost. soc. nat. hist., xx, 85-86 (1879)—Pezotettix.
Colorado to Montana.

glacialis Scudd., Bost. journ. nat. hist., vii, 630-631, pl. 14, fig. 9, 10 (1863)—Pezotettix.
Walk., Cat. salt. Brit. mus., v, Suppl., 72 (1871).
borealis Glov. (nec Scudd.), Ill. N. A. ent., Orth., pl. 6, fig. 16-18 (1872)—Pezotettix.
Northern New England, New York, Ontario.

marshallii Thom., Rep. U. S. geol. surv. west 100 mer., v, 889-890, pl. 45, fig. 3 (1875)—Pezotettix.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
Colorado.

nubicola Scudd., Rev. Mel., 98, 102-104, pl. 7, fig. 5 (1897).
Colorado.

oregonensis Thom., Rep. U. S. geol. surv. west 100 mer., v, 888, 889 (1875)—Pezotettix.
Scudd., Rep. ent. soc. Ont., xxvi, 63 (1896).
Oregon, Idaho, Montana, Alberta.

polita Scudd., Proc. Dav. acad. sc., vii, 157-160, pl. 7, fig. 1, 2 (1899).
Oregon.

stupefacta Scudd., Ann. rep. chief eng., 1876, 503 (1876)—Pezotettix.
Scudd., Rev. Mel., 98, 104-105, pl. 7, fig. 6 (1897).
Colorado, New Mexico.

variegata Scudd., Rev. Mel., 97, 101-102, pl. 7, fig. 4 (1897).
glacialis Comst. (nec Scudd.), Intr. ent., 107 (1888).
New York, Ontario.

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PARATYLOTROPIDIA Brunner.

brunneri Scudd., Rev. Mel., 118-120, pl. 9, fig. 4, 5 (1897).
Dakota to Texas.

MELANOPLUS Stål.

ablutus Scudd., Proc. Dav. acad. nat. sc., vii, 185-186, pl. 8, fig. 3 (1899).
California.

acutus Scudd., Proc. Dav. acad. nat. sc., vii, 168, 171-172 (1899).
Minnesota.

affinis Brun., Scudd., Proc. amer. phil. soc., xxxvi, 20, 32 (1897).
Utah to British Columbia.

alaskanus Scudd., Proc. amer. phil. soc , xxxvi, 20, 32 (1897).
Alaska, British Columbia.

algidus Scudd., Proc. Dav. acad. nat. sc., vii, 195, 199-201, pl. 9, fig. 6 (1899).
Oregon.

alleni Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).
Iowa, Dakota.

alpinus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 28, 35 (1897).
Colorado to Alberta.

altitudinum Scudd., Proc. Bost. soc. nat. hist., xx, 86 (1879)—Pezotettix.
Scudd., Rep. ent. soc. Ont., xxvi, 66 (1896).

marshallii Scudd. (nec Thom.), Ann. rep. chief eng., 1876, 502 (1876)—Pezotettix.

sanguinipes Brun., Publ. Nebr. acad. sc., iii, 27 (1893)—Pezotettix.
Rocky Mt. region.

amplectens Scudd., Proc. amer. phil. soc., xxxvi, 13, 14, 34 (1897).
Kentucky.

angelicus Scudd., Proc. amer. phil. soc., xxxvi, 22, 32 (1897).
California.

angustipennis Dodge, Can. ent., ix, 111, (1877)—Caloptenus.
Brun., Bull. Washb. coll., i, 138 (1885).
Indiana to Montana.

arboreus Scudd., Proc. amer. phil. soc., xxxvi, 31, 35 (1897).
Texas to Arizona.

aridus Scudd., Proc. Bost. soc. nat. hist., xx, 84-85 (1879)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 8, 33 (1897).

humphreysii Thom. (pars), Rep. U. S. geol. surv. west 100 mer., v, 890, pl. 45, fig. 1, 2 (1875)—Pezotettix
Arizona.

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MELANOPLUS (Continued).

arizonae Scudd., Proc. Bost. soc. nat. hist., xx, 64-65 (1879).
Arizona.

artemisiae Brun., Scudd., Proc. amer. phil. soc., xxxvi, 8, 33 (1897).
Idaho.

ascensus Scudd., Proc. Dav. acad. nat. sc., vii, 195, 196-197, pl. 9, fig. 3 (1899).
California, Oregon.

ater Scudd., Proc. amer. phil. soc., xxxvi, 17, 22, 32 (1897).
California.

atlanis Ril., Ann rep. ins. Mo., vii, 169 (1875)—Caloptenus.
Scudd., Rep. U. S. ent. comm., ii, app., 24, pl. 17, fig. 6 (1881).
Hunt, Miss. ess. econ. ent. Ill., 120, 126 (1886)—Pezotettix.
spretus Pack. (nec Uhl.), Amer. nat., viii, 502 (1874)—Caloptenus.
atlantis Thom., Bull. Ill. mus. nat. hist., i, 68 (1876)—Caloptenus.
femur rubrum Prov. (nec De Geer), Nat. canad., viii, 109-110, fig. 12 (1876)—Caloptenus.
devastator (pars) Scudd., Proc. Bost. soc. nat. hist., xix, 285-286, 287-288 (1878).
bilituratus Brun. (nec Walk.), Rep. U. S. ent. comm., iii, 60 (1883)—Caloptenus.
Most of U. S. and Canada.

attenuatus Scudd., Proc. amer. phil. soc., xxxvi, 13, 34 (1897).
N. Carolina.

baconi McNeill, Psyche, viii, 345, 369-370 (1899).
Arkansas.

bilituratus Walk., Cat. Derm. salt. Brit. mus., iv, 679 (1870)—Caloptenus.
Caulf. (pars), Rep. ent. soc. Ont., xviii, 71 (1886).
Caulf. (pars), Can. rec. sc., ii, 401 (1887)—Caloptenus (Melanoplus).
?*scriptus* Cock., Trans. amer. ent. soc., xx, 337 (1894).
Montana to Oregon and British Columbia.

bispinosus Scudd., Proc. amer. phil. soc., xxxvi, 25, 34 (1897).
Texas.

bivittatus Say, Journ. acad. sc. Philad., iv, 308 (1825)—Gryllus.
Haan, Bijdr. kenn. Orth., 144 (1842)—Acridium (Opsomala).
Uhl. (pars), Say, Ent. N. A., ed. LeC., ii, 238 (1859)—Caloptenus.
Uhl. (pars), Harr., Ins. inj. veg., 3 ed., 174 (1862)—Acridium (Caloptenus).

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Thom., Trans. Ill. st. agric. soc., v, 449 (1865)—Acridium.
Scudd. (pars), Hitchc., Rep. geol. N. H., i, 376 (1874).
Stål, Bih. sv. vet.-akad. handl., v, no. 9, 14 (1878)—Pezotettix.
?*sumichrasti* Sauss., Rev. mag. zool., 1861, 160-161 (1861)—Pezotettix.
Southern Canada to the Gulf except Atlantic States; Washington, British Columbia.

blandus Scudd., Proc. Dav. acad. nat. sci., vii, 161-162, pl. 7. fig. 3 (1899).
California.

blatchleyi Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).
occidentalis Brun. (nec Thom.), Can. ent., viii, 124 (1876)—Pezotettix.
viola Blatchl. (nec Thom.), Can. ent., xxvi, 243-244 (1894)—Pezotettix.
Indiana to Nebraska and Minnesota.

borckii Stål, Orth. Eug. resa, 332 (1861)—Acridium (Podisma).
Walk., Cat. Derm. salt. Brit. mus., iv, 718 (1870)—Podisma.
Stål, Rec. Orth., i, 79 (1873)—Pezotettix (Melanoplus).
Thom., Rep. U. S. geol. surv. terr., v, 149 (1873)—Pezotettix.
Scudd., Rep. ent. soc. Ont., xxvi, 66 (1896).
Wyoming to Washington.

borealis Fieb., Lotos, iii, 120 (1853)—Caloptenus.
Caulf., Rep. ent. soc. Ont., xviii, 71 (1886).
septentrionalis Sauss., Rev. mag. zool., 1861, 159 (1861)—Pezotettix.
?*arcticus* Walk., Cat. Derm. salt. Brit. mus., iv, 681-682 (1870)—Caloptenus.
Arctic America.

bowditchi Scudd., Proc. Bost. soc. nat. hist., xx, 72 (1879).
Kansas to New Mexico.

bruneri Scudd., Proc. amer. phil. soc., xxxvi, 19, 32 (1897).
extremus Brun. (nec Walk.), Can. ent., xvii, 18 (1885).
Washington to Alberta and Nebraska.

calidus Scudd., Proc. Dav. acad. nat. sc., vii, 203-204 (1899).
New Mexico.

canonicus Scudd., Proc. amer. phil. soc., xxxvi, 26, 34 (1897).
Arizona.

cinereus Scudd., Proc. Bost. soc. nat. hist., xix, 288, 290 (1878).
Ril., Stand. nat. hist., ii, 195 (1884)—Caloptenus.
Mississippi River to Pacific.

clypeatus Scudd., Proc. Bost. soc. nat. hist., xix, 40 (1877)—Caloptenus.
Scudd., Can. ent., xii, 75 (1880).
Georgia.

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MELANOPLUS (Continued).

coccineipes Scudd., Proc. amer. phil. soc., xxxvi, 26, 34 (1897).
minor Scudd., Bull. U. S. geol. surv. terr., ii, 261 (1876) (nec 1875) —Caloptenus.
devastator Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 285-286, 287-288 (1878).
Ontario to Utah.

collinus Scudd., Proc. Bost. soc. nat. hist., xix, 285 (1878).
Northeastern U. S.

compactus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 27, 34 (1897).
Dakota, Nebraska.

comptus Scudd., Proc. amer. phil. soc., xxxvi, 26, 34 (1897).
Minnesota to Nebraska.

confusus Scudd., Proc. amer. phil. soc., xxxvi, 29, 35 (1897).
Kentucky.

consanguineus Scudd., Proc. amer. phil. soc., xxxvi, 21, 32 (1897).
California.

conspersus Scudd., Proc. amer. phil. soc., xxxvi, 27, 34 (1897).
Nebraska.

corpulentus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 27, 34 (1897).
N. Mexico.

cuneatus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 17, 32 (1897).
New Mexico, Arizona.

cyanipes Brun., Scudd., Proc. amer. phil. soc., xxxvi, 25, 34 (1897).
California.

dawsoni Scudd., Daws., Rep. geol. 49 par., 343 (1875)—Pezotettix. Scudd., Rep. ent. soc. Ont., xxvi, 64 (1896).
tellustris Scudd., Ann. rep. chief eng., 1876, 502 (1876)—Pezotettix.
abditus Dodge, Can. ent., ix, 113 (1877)—Pezotettix.
Manitoba to Nebraska, west to Rocky Mts.

dealbatus Scudd., Proc. Dav. acad. nat. sc., vii, 190-192, pl. 8, fig. 7, 8 (1899).
California.

debilis Scudd., Proc. Dav. acad. nat. sc., vii, 196, 201-202, pl. 9, fig. 7 (1899).
Oregon.

decorus Scudd., Proc. amer. phil. soc., xxxvi, 13, 33 (1897).
N. Carolina.

defectus Scudd., Proc. amer. phil. soc., xxxvi, 20, 32 (1897).
Colorado.

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deletor Scudd., Proc. Bost. soc. nat. hist., xvii, 475-476 (1875)—Caloptenus.

Scudd., Cent. Orth., 84 (1879).

Gulf states.

devastator Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 285-286, 287-288 (1878).

Ril., Bull. Div. ent. U. S. dep. agric., xxv, 28-30, fig. 6a-d, 7a-c, (1891)—Caloptenus.

affinis Coq., Ins. life, i, 227 (1889).

Pacific states, Nevada, Arizona.

differentialis Uhl., Thom., Trans. Ill. st. agric. soc., v, 450 (1865)—Acridium.

Walsh-Ril., Amer. ent., i, 16 (1868)—Caloptenus.

Walk., Cat. Derm. salt. Brit. mus., iv, 610 (1870)—Cyrtacanthacris.

Stål, Bih. sv. vet.-akad. handl., v, no. 9, 14 (1878)—Pezotettix.

Brun., Bull. Washb. coll., i, 139 (1885).

New Jersey to California, Wyoming to New Mexico and Texas.

diminutus Scudd., Proc. amer. phil. soc., xxxvi, 21, 32 (1897).

California.

discolor Scudd., Proc. Bost. soc. nat. hist., xx, 81-82 (1879)—Pezotettix.

Scudd., Proc. amer. phil. soc., xxxvi, 7, 32 (1897).

Texas.

dumicola Scudd., Proc. Bost. soc. nat. hist., xx, 76-77 (1879)—Pezotettix.

Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).

Texas.

elongatus Scudd., Proc. amer. phil. soc., xxxvi, 18, 32 (1897).

Kansas to New Mexico.

excelsus Scudd., Proc. amer. phil. soc., xxxvi, 19, 32 (1897).

Colorado.

extremus Walk., Cat. Derm. salt. Brit. mus., iv, 681 (1870)—Caloptenus.

Brun., Can. ent., xvii, 18 (1885).

?*leucostoma* Kirby, Faun. bor. amer., iv, 250 (1837)—Locusta.

junius Dodge, Can. ent., viii, 9 (1876)—Pezotettix.

parvus Prov., Nat. canad., viii, 110 (1876)—Caloptenus.

Northernmost U. S. and Canada.

fasciatus Barnst., Walk., Cat. Derm. salt. Brit. mus., iv, 680 (1870)—Caloptenus.

Caulf., Rep. ent. soc. Ont., xviii, 71 (1886).

borealis Scudd. (nec Fieb.), Can. nat., vii, 286 (1862)—Pezotettix.

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MELANOPLUS (Continued).

rectus Scudd., Proc. Bost. soc. nat. hist., xix, 284, 285 (1878).
curtus Scudd., Ibid., xx, 70-71 (1879).
Northern half of N. America.

femoratus Burm., Handb. ent., ii, 638 (1838)—Caloptenus.
Haan, Bijdr. kenn. Orth., 144 (1842)—Acridium (Caloptenus).
Scudd., Proc. Bost. soc. nat. hist., xix, 285, 288 (1878).
Caulf., Can. rec. sc., ii, 401 (1887)—Caloptenus (Melanoplus).
milberti Serv., Orth., 649 (1839)—Acridium.
flavovittatus Harr., Ins. inj. veg., 140 (1841)—Acridium.
bivittatus Uhl., pars (nec Say), Say, Ent. N. A., ed. LeC., ii, 238 (1859)—Caloptenus.
edax Sauss., Rev. mag. zool., 1861, 161 (1861)—Pezotettix.
Hudson Bay to N. Carolina, Vancouver to southern California.

femur nigrum Scudd., Proc. Dav. acad. nat. sci., vii, 165-167, pl. 7, fig. 4 (1899).
Arizona.

femur rubrum DeGeer, Mém., iii, 498, pl. 42, fig. 5 (1773)—Acridium.
Goeze, Ent. beytr., ii, 115 (1778)—Gryllus (Locusta).
Burm., Handb. ent., ii, 638 (1838)—Caloptenus.
Haan, Bijdr. kenn. Orth., 143 (1842)—Acridium (Caloptenus).
Stål, Rec. Orth., i, 79 (1873)—Pezotettix (Melanoplus).
Scudd., Hitchc., Rep geol. N. H., i, 375 (1874).
Stål, Bih. sv. vet.-akad. handl., v, no. 9, 13 (1878)—Pezotettix.
Caulf., Can. rec. sc., ii, 401 (1887)—Caloptenus (Melanoplus).
erythropus Gmel., Linn., Syst. nat., i, pt. iv, 2086 (1788)—Gryllus (Locusta).
femoralis Oliv., Encycl. méth., vi, 228 (1791)—Acridium.
devorator Scudd., Proc. Bost. soc. nat. hist., xvii, 474-475 (1875)—Caloptenus.
sanguinolentus Prov., Nat. canad., viii, 109 (1876)—Caloptenus.
atlanis Prov. (nec Ril.), Faune ent. can., ii, 35 (1877)—Caloptenus.
interior Scudd., Proc. Bost. soc. nat. hist., xx, 71-72 (1879).
Most of N. America.

flabellatus Scudd., Proc. Bost. soc. nat. hist., xx, 82-83 (1879)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
Texas.

flabellifer Scudd., Proc. Bost. soc. nat. hist., xx, 68-69 (1879).
occidentalis Towns. (nec Thom.), Ins. life, vi, 31 (1893).
Montana to New Mexico.

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flavescens Scudd., Proc. amer. phil. soc., xxxvi, 17, 32 (1897).
California.

flavidus Scudd., Proc. Bost. soc. nat. hist., xx, 74 (1879).
cenchri McNeill, Psyche, vi, 74-75 (1891).
Illinois and Montana to Texas and Arizona.

fluviatilis Brun., Ann. rep. Nebr. bd. agric., 1896, 136-137, fig. 34 (1897).
Nebraska.

foedus Scudd., Proc. Bost. soc. nat. hist., xx, 69 (1879).
Idaho and Dakota to New Mexico.

franciscanus Scudd., Proc. Dav. acad. nat. sc., vii, 183-184, pl. 8, fig. 1, 2 (1899).
Arizona.

furcatus Scudd., Proc. amer. phil. soc., xxxvi, 30, 35 (1897).
Florida.

fuscipes McNeill, Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
California.

gillettei Scudd., Proc. amer. phil. soc., xxxvi, 8, 33 (1897).
Colorado.

gladstoni Brun., Scudd., Proc. amer. phil. soc., xxxvi, 23, 33 (1897).
Assiniboia and Minnesota to Colorado.

glaucipes Scudd., Proc. Bost. soc. nat. hist., xvii, 476-477 (1875)—Caloptenus.
Scudd., Can. ent., xii, 75 (1880).
Texas.

gracilipes McNeill, Scudd., Proc. amer. phil. soc., xxxvi, 11, 33 (1897).
California.

gracilis Brun., Can. ent., viii, 124 (1876)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 16, 35 (1897).
minutipennis Thom., Bull. Ill. mus. nat. hist., i, 66 (1876)—Pezotettix.
Indiana and Kentucky to Nebraska and Dakota.

herbaceus Brun., Bull. div. ent. U. S. dep. agric., xxviii, 25-26, fig. 13ab (1893).
Texas to Arizona.

humphreysii Thom. (pars), Rep. U. S. geol. surv. west 100 mer., v, 890 (1875)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 7, 33 (1897).
Arizona.

huroni Blatchl., Psyche, viii, 195-196 (1898).
Michigan.

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MELANOPLUS (Continued).

immunis Scudd., Proc. Dav. acad. nat. sc., vii, 167, 170-171 (1899).
Oregon.

impiger Scudd., Proc. amer. phil. soc., xxxvi, 26, 34 (1897).
Minnesota to Texas.

impudicus Scudd., Proc. amer. phil. soc., xxxvi, 22, 32 (1897).
Georgia to Arkansas.

incisus Scudd., Proc. Dav. acad. nat. sc., vii, 162, 163-164 (1899).
Colorado.

incultus Scudd., Proc. Dav. acad. nat. sc., vii, 175, 181-182, pl. 7, fig. 10 (1899).
Colorado.

indigens Scudd., Proc. amer. phil. soc., xxxvi, 8, 33 (1897).
Idaho.

infantilis Scudd., Proc. Bost. soc. nat. hist., xx, 65-67 (1879).
Northern half of U. S. west of Mississippi River, western Canada.

inops Scudd., Proc. amer. phil. soc., xxxvi, 16, 35 (1897).
Florida.

intermedius Brun., Scudd., Proc. amer. phil. soc., xxxvi, 20, 32 (1897).
Colorado to Washington.

islandicus Blatchl., Psyche, viii, 196-197 (1898).
abortivus Walk., Can. ent., xxx, 90-92 (1898).
Michigan, Ontario.

juvencus Scudd., Proc. amer. phil. soc., xxxvi, 9, 14, 34 (1897).
puer Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 87 (1877)—Pezotettix.
Florida.

keeleri Thom., Bull. U. S. geol. surv. terr., i, no. 2, 69 (1874)—Caloptenus.
Scudd., Proc. amer. phil. soc., xxxvi, 29, 35 (1897).
tenebrosus Scudd., Proc. Bost. soc. nat. hist., xx, 63 (1879).
Southern states.

kennicottii Scudd., Proc. Bost. soc. nat. hist., xix, 287, 289, 290 (1878).
bilituratus Scudd. (nec Walk.), Daws., Rep. geol. 49 par., 343 (1875).
Montana to Alaska.

lakinus Scudd., Proc. Bost. soc. nat. hist., xx, 79-80 (1879)—Pezotettix.
Brun., Bull. div. ent. U. S. dep. agric., n. s., vii, 37 (1897).
Nebraska to New Mexico.

lepidus Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).
Nevada, California.

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ligneolus Scudd., Proc. Dav. acad. nat. sc., vii, 187, 188-190, pl. 8, fig. 5, 6 (1899).
California.

luridus Dodge, Can. ent., viii, 11 (1876)—Caloptenus.
Brun., Rep. U. S. ent. comm., ii, 60 (1883).
Northern half of U. S. west of Mississippi River.

mancus Smith, Proc. Portl. soc. nat. hist., i, 149 (1868)—Pezotettix.
Walk., Cat. Derm. salt. Brit. mus., v, 72 (1871) – Podisma.
Scudd., Rep. ent. soc. Ont., xxvi, 66 (1896).
New England; Illinois?

marginatus Scudd., Ann. rep. chief eng., 1876, 504 (1876)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 16, 28, 35 (1897).
California.

militaris Scudd., Proc. amer. phil. soc., xxxvi, 9, 33 (1897).
Idaho.

minor Scudd., Proc. Bost. soc. nat. hist., xvii, 478 (1875)—Caloptenus.
Scudd., Cent. Orth., 84 (1879).
occidentalis Thom., Ann. rep. chief eng., 1878, 1845 (1878)—Caloptenus.
Northern half of U. S. and bordering parts of Canada.

missionum Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
California.

montanus Thom., Rep. U. S. geol. surv. terr., v, 155 (1873)—Platyphyma.
Scudd, Rep. ent. soc. Ont., xxvi, 66 (1896).
Montana.

monticola Brun., Scudd., Proc. amer. phil. soc., xxxvi, 23, 24, 34 (1897).
montanus Scudd. (nec Thom.), Appal., i, 263 (1878)—Platyphyma.
Colorado.

nanus Scudd., Proc. Dav. acad. nat. sc., vii, 187-188, pl. 8, fig. 4 (1899).
California.

nigrescens Scudd., Proc. Bost. soc. nat. hist., xix, 27 (1877)—Caloptenus.
Scudd., Cent. Orth., 84 (1879).
Scudd., Can. ent., xii, 75 (1880)—Pezotettix.
?*zimmermanni* Sauss., Rev. mag. zool., 1861, 159 (1861)—Pezotettix.
South Atlantic states.

obovatipennis Blatchl., Can. ent., xxvi, 241-243 (1894)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 14, 34 (1897).

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MELANOPLUS (Continued).

?*longicornis* Sauss., Rev. mag. zool., 1861, 159, (1861)—Pezotettix.
rotundipennis Blatchl. (nec Scudd.), Can. ent., xxiii, 80 (1891)—Pezotettix.
Indiana to Arkansas and Texas.

occidentalis Thom., Ann. rep. U. S. geol. surv. terr., v, 453, pl. 2, fig. 2 (1872)—Caloptenus.
Brun., Publ. Nebr. acad. sc., iii, 28 (1893).
variolosus Scudd., Proc. Bost. soc. nat. hist., xx, 67-68 (1879).
N. Dakota to New Mexico.

olivaceus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 31, 35 (1897).
California.

pacificus Scudd., Rep. U. S. ent. comm., ii, app., 24-25, pl. 17, fig. 16 (1881)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
California, Nevada.

packardii Scudd., Proc. Bost. soc. nat. hist., xix, 287 (1878).
fasciatus Scudd. (nec Walk.), Ibid., xvii, 477 (1875)—Caloptenus.
Mississippi River to Pacific, western Canada.

palmeri Scudd., Proc. amer. phil. soc., xxxvi, 23, 33 (1897).
New Mexico, Arizona.

paroxyoides Scudd., Proc. amer. phil. soc., xxxvi, 28, 35 (1897).
Florida.

phoetaliotiformis Scudd., Proc. Dav. acad. nat. sc., vii, 175, 179-180, pl. 7, fig. 9 (1899).
Minnesota to California.

pictus Brun., Scudd., Proc. amer. phil. soc., xxxvi, 18, 32 (1897).
Arizona.

pilatus Scudd., Proc. Dav. acad. nat. sc., vii, 192-194, pl. 9, fig. 1, 2 (1899).
Colorado.

pinctus Scudd., Proc. Dav. acad. nat. sc., vii, 174, 175-177, pl. 7, fig. 7 (1899).
California.

plebejus Stål, Bih. sv. vet.-akad. handl., v, no 9, 12 (1878)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 16, 35 (1897).
pupaeformis Scudd., Proc. Bost. soc. nat. hist., xx, 83-84 (1879)—Pezotettix.
Texas.

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plumbeus Dodge, Can. ent., ix, 112 (1877)—Caloptenus.
Brun., Bull. div. ent. U. S. dep. agric., xviii, 32-33, fig. 16 (1893).
Wyoming, Colorado, Nebraska, Kansas.

propinquus McNeill, Scudd., Proc. amer. phil. sc., xxxvi, 24, 34 (1897).
femur rubrum Scudd. (nec DeGeer), Proc. Bost. soc. nat. hist., xix, 86 (1877)—Caloptenus.
Southeastern U. S.

puer Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 87 (1877)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
Florida.

punctulatus Uhl., Scudd., Bost. journ. nat. hist., vii, 465 (1862)—Caloptenus.
Scudd., Hitchc., Geol. N. H., i, 376 (1874).
griseus Thom., Ann. rep. U. S. geol. surv. terr., v, 454 (1872)—Caloptenus.
helluo Scudd., Proc. Bost. soc. nat. hist., xvii, 476 (1875)—Caloptenus.
Maine to Virginia, Texas and Nebraska.

rileyanus McNeill, Scudd., Proc. amer. phil. soc., xxxvi, 7, 32 (1897).
California.

robustus Scudd., Proc. Bost. soc. nat. hist., xvii, 473 (1875)—Caloptenus.
Stål, Bih. sv. vet -akad. handl., v, no. 9, 14 (1878)—Pezotettix.
Scudd., Cent. Orth., 84 (1879).
ponderosus Scudd., Proc. Bost. soc. nat. hist., xvii, 473 (1875)—Caloptenus.
Texas.

rotundipennis Scudd., Proc. Bost. soc. nat. hist., xix, 86-87 (1877)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 14, 34 (1897).
Florida.

rusticus Stål, Bih. sv. vet.-akad. handl., v, no. 9, 13 (1878)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 11, 33 (1897).
Texas.

saltator Scudd., Proc. amer. phil. soc., xxxvi, 14, 34 (1897).
borckii Scudd. (nec Stål), Rep. U. S. ent. comm., ii, app., 24, pl. 17, fig. 17 (1881) – Pezotettix.

scudderi Uhl., Proc. ent. soc. Philad., ii, 555 (1864)—Pezotettix.
Walk., Cat. Derm. salt. Brit. mus., iv, 718 (1870)—Podisma.
Scudd., Proc. amer. phil. soc., xxxvi, 8, 33 (1897).
unicolor Thom., Rep. U. S. geol. surv. terr., v, 151 (1873)—Pezotettix.
U. S. east of Great Plains.

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MELANOPLUS (Continued).

sierranus Scudd., Proc. amer. phil. soc., xxxvi, 21, 32 (1897).
California.

silvaticus McNeill, Psyche, viii, 345, 368-369 (1899).
Arkansas.

simplex Scudd., Proc. amer. phil. soc., xxxvi, 7, 32 (1897).
Colorado.

snowi Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).
N. Mexico.

spretus Uhl., Walsh, Pract. ent., ii, 1 (1866)—Caloptenus.
Stål, Bih. sv. vet.-akad. handl., v, no 9, 14 (1878)—Pezotettix.
Scudd., Proc. Bost. soc. nat. hist., xix, 287 (1878).
spretis Thom., Trans. Ill. st. agric. soc., v, 450 (1865)—Acridium.
Saskatchewan to Colorado; at times most of the U. S. west of the Mississippi; western Canada.

tenuipennis McNeill, Scudd., Proc. amer. phil. soc., xxxvi, 12, 33 (1897).
California.

terminalis Scudd., Proc. amer. phil. soc., xxxvi, 25, 34 (1897).
Texas.

texanus Scudd., Proc. Bost. soc. nat. hist., xx, 80-81 (1879)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 15, 34 (1897).
scudderi Brun. (nec Uhl.), Bull. Washb. coll., i, 136 (1885).
Kansas to Texas.

truncatus Scudd., Proc. Dav. acad. nat. sc., vii, 175, 177-179, pl. 7, fig. 8 (1899).
Arizona.

uniformis Scudd., Proc. amer. phil. soc., xxxvi, 22, 32 (1897).
devastator (pars) Scudd., Proc. Bost. soc. nat. hist., xix, 285-286, 287-288 (1878).
California.

usitatus Scudd., Proc. Dav. acad. nat. sc., vii, 168, 172-174 (1899).
Oregon.

utahensis Brun., Scudd., Proc. amer. phil. soc., xxxvi, 19, 32 (1897).
Utah.

validus Scudd., Proc. Dav. acad. nat. sc., vii, 195, 197-199, pl. 9, fig. 4, 5 (1899).
Oregon.

varicus Scudd., Proc. Dav. acad. nat. sc., vii, 167, 168 169, pl. 7, fig. 5, 6 (1899).
California.

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viola Thom., Bull. Ill. mus. nat. hist., i, 68 (1876)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 30, 35 (1897).
affiliatus Uhl., Scudd., Can. ent., xii, 75 (1880)—Pezotettix.

virgatus McNeill, Scudd., Proc. amer. phil. soc., xxxvi, 22, 32 (1897).
devastator (pars) Scudd., Proc. Bost. soc. nat. hist., xix, 285-286, 287-288 (1878).
California.

viridipes Walsh, Blatchl., Can. ent., xxiii, 80 (1891)—Pezotettix.
Scudd., Proc. amer. phil. soc., xxxvi, 13, 33 (1897).
viridulus (*viridicrus*) McNeill, Psyche, vi, 75-76 (1891)—Pezotettix.
Indiana, Illinois.

walshii Scudd., Proc. amer. phil. soc., xxxvi, 6, 11, 33 (1897).
Michigan to Iowa.

washingtonianus Brun., Can. ent., xvii, 14-15 (1885)—Pezotettix.
Scudd., Rep. ent. soc. Ont., xxvi, 66 (1896).
Washington.

yarrowi Thom., Rep. U. S. geol. surv. west 100 mer., v, 894, pl. 45, fig. 5 (1875)—Caloptenus.
Scudd., Proc. amer. phil. soc., xxxvi, 31, 35 (1897).
Colorado.

PHOETALIOTES Scudder.

nebrascensis Thom., Ann. rep. U. S. geol. surv. terr., v, 455 (1872)—Pezotettix.
Brun., Publ. Nebr. acad. sc., iii, 28 (1893)—Euprepocnemis.
Scudd., Rep. ent. soc. Ont., xxvi, 63 (1896).
megacephala Thom., Dodge, Can. ent., iv, 15 (1872)—Pezotettix.
autumnalis Dodge, Can. ent., viii, 10 (1876)—Pezotettix.
sanguinocephalus La Mun., Proc. Nebr. ass. adv. sc., March 8, 1877—Caloptenus.
volucris Dodge, Can. ent., ix, 112 (1877)—Caloptenus.
Rocky Mts. to Mississippi River.

PAROXYA Scudder.

atlantica Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 29, 88 (1877).
Georgia, Florida.

floridana Thom., Bull. U. S. geol. surv. terr., i, no 2, 68 (1874)—Caloptenus.
Smith, Cat. ins. N. J., 412 (1890).
atlantica Scudd. (pars), Proc. Bost. soc. nat. hist., xix, 29, 88 (1877).

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PAROXYA (Continued).

recta Scudd., Ibid., xix, 30, 88 (1877).
Eastern U. S. and Gulf states.

hoosieri Blatchl., Can. ent., xxiv, 31-33 (1892)—Pezotettix.
Scudd., Proc. amer. acad. arts sc., xxxii, 205 (1897).
atlantica Blatchl. (nec Scudd.), Can. ent., xxv, 90 (1893).
Ohio, Indiana.

scudderi Blatchl., Can. ent., xxx, 59-60, 64 (1898).
Indiana.

POECILOTETTIX Scudder.

coccinatus Scudd., Rev. Mel., 386, 389-390, pl. 26, fig. 3 (1897).
California.

pantherinus Walk.,* Cat. Derm. salt. Brit. mus., iv, 623 (1870)—Acridium.
picticornis Thom., Proc. Dav. acad. nat. sc., ii, 125, pl. 4, fig. 1, 2, —Caloptenus (Hesperotettix).
Arizona.

sanguineus Scudd., Rev. Mel., 386, 387-389, pl. 26, fig. 2 (1897)
Arizona.

OEDALEONOTUS Scudder.

enigma Scudd., Ann. rep. chief eng., 1876, 505 (1876)—Pezotettix.
Scudd., Rev. Mel., 391-393, pl. 26, fig. 4-6 (1897).
jucundus Scudd., Ann. rep. chief eng., 1876, 505 (1876)—Pezotettix.
collaris Scudd., Proc. Bost. soc. nat. hist, xix, 286 (1878)—Melanoplus.
flavoannulatus Brun., Ins. life, iii, 140 (1890)—Melanoplus.
flavolineatus Brun. (nec Thom.), Bull. div. ent. U. S. dep. agric., xxviii, 33 (1893)—Caloptenus.
Pacific coast.

ASEMOPLUS Scudder.

montanus Brun., Can. ent., xvii, 16-17 (1885)—Bradynotes.
Scudd., Rep. ent. soc. Ont., xxvi, 65 (1896).
Montana to Washington.

nudus Walk., Can. ent., xxx, 197-199, pl. 6 (1898).
Alberta, British Columbia.

APTENOPEDES Scudder.

aptera Scudd., Proc. Bost. soc. nat. hist., xix, 86 (1877).
Gulf states.

* This determination I owe to the communication of Prof. L. Bruner.

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rufovittata Scudd., Proc Bost. soc. nat. hist., xix, 85 (1877).
Florida.

sphenarioides Scudd., Proc. Bost. soc. nat. hist., xix, 84 (1877).
Florida.

Dactyloti.

DACTYLOTUM Charpentier.

variegatum Scudd., Proc. Bost. soc. nat. hist, xx, 75 (1879)—Pezotettix.
Towns., Ins. life, vi, 30-31 (1893).
New Mexico to California.

pictum Thom., Proc. acad. nat. sc. Philad., 1870, 78 (1870)—Pezotettix.
Gerst., Stett. ent. zeit., xxxiv, 192(1873).
Brun., Bull. div. ent. U. S. dep. agric., iv, 57 (1884)—Pezotettix (Dactylotum).
Colorado, southward.

LOCUSTIDAE.

PHANEROPTERINAE.

Odonturae.

DICHOPETALA Brunner.

emarginata Brunn., Monogr. Phaner., 77 (1878).
Texas.

Hormiliae.

HORMILIA Stål.

elegans Scudd. (See Appendix).
New Mexico.

ARETHAEA Stål.

constricta Brunn., Monogr. Phaner., 236 (1878).
Texas.

gracilipes Thom., Proc. acad. nat. sc. Philad., 1870, 76 (1870)—Ephippitytha.
Stål, Bih. sv. vet.-akad. handl., iv, no 5, 55 (1876).
grallator Scudd., Proc. Bost. soc. nat. hist., xix, 39 (1877)—Aegipan.
Kansas, Colorado, Texas, Arizona.

phalangium Scudd., Proc. Bost. soc. nat. hist., xix, 40 (1877)—Aegipan.
multiramosa Brunn., Monogr. Phaner., 235 (1878).
Georgia.

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Steirodontia.

STILPNOCHLORA Stål.

marginella Serv., Orth., 405 (1839)—Phylloptera.
Stål, Öfv. vet.-akad. förh., xxx, no 4, 40 (1873).
thoracica Burm. (nec Serv.), Handb. ent., ii, 693 (1838)—Phylloptera.
couloniana Sauss., Rev. mag. zool., 1861, 128 (1861)—Phylloptera.
thoracica Scudd., Bost. journ nat. hist., vii, 447 (1862)—Microcentrum. Name independent of Burmeister's.
Florida Keys.

PEUCESTES Stål.

dentatus Stål, Rec. Orth, ii, 45 (1874).
citrifolius Blanch. (nec Linn.), Hist. nat. ins., 24, pl. 7 (1840)—Phaneroptera.
Texas.

Scudderiae.

SCUDDERIA Stål.

curvicauda De Geer, Mém., iii, 446, pl. 38, fig. 3 (1773)—Locusta.
Goeze, Ent. beytr., ii, 98 (1778)—Gryllus (Tettigonia).
Scudd. (pars), Bost. journ. nat. hist., vii, 448 (1862)—Phaneroptera.
Stål, Öfv. vet.-akad. förh., xxx, 41 (1873).
angustifolia Harr., Ins. inj. veg., 129 (1841)—Phaneroptera.
furculata Beut. (nec Brunn.), Bull. amer. mus. nat. hist., vi, 275 (1894).
U. S. east of Great Plains.

furcata Brunn., Monogr. Phaner., 239, pl. 5, fig. 72a (1878).
?*myrtifolia* Drury (nec Linn.), Ill. nat. hist., ii, 78, pl. 41, fig. 2 (1773)—Gryllus (Locusta).
curvicauda Burm. (nec De Geer), Handb. ent., ii, 690 (1838)—Phaneroptera.
angustifolia Blatchl. (nec Harr.), Proc. Ind. acad. sc., 1892, 102-103 (1894).
fasciata Beut., Bull. amer. mus. nat. hist., vi, 276 (1894).
U. S. and southern Canada east of Great Plains.

furcifera Scudd., Proc. amer. acad. arts sc., xxxiii, 275, 276, 282-283, pl., fig. 7 (1898).
Arizona.

laticauda Brunn., Monogr. Phaner., 238-239 (1878).
Georgia, Florida, Texas.

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mexicana Sauss., Rev. mag. zool., 1861, 129 (1861)—Phaneroptera.
Scudd., Proc. amer. acad. arts sc., xxxiii, 274, 276, 280, pl., fig. 5 (1898).
furculata Brunn., Mon. Phaneropt., 239, pl. 5, fig. 72b (1878).
Oregon, California, Texas.

pistillata Brunn., Monogr. Phaner., 240-241 (1878).
curvicauda (pars) Scudd. (nec De Geer), Bost. journ.nat. hist., vii, 448 (1862).
furculata Blatchl. (nec Brunn.), Proc. Ind. acad. sc., 1892, 100-101 (1894).
Northern U. S. and Canada, east of Great Plains.

septentrionalis Serv., Orth., 416 (1839)—Phaneroptera.
Scudd., Proc. amer. acad. arts sc., xxxiii, 275, 276, 285-286, pl., fig. 9 (1898).
suturalis Heer, Insektenf. tert. Oen., ii, 4 (1849)—Phaneroptera.
curvicauda (pars) Scudd. (nec De Geer), Bost. journ. nat. hist., vii, 448 (1862)—Phaneroptera.
angustifolia Brunn. (nec Harr.), Monogr. Phaner., 241 (1878).
truncata Beut., Bull. amer. mus. nat. hist., vi, 252 (1894).
Atlantic states.

texensis Sauss.-Pict., Biol. centr. amer, Orth., 328, 329, 330, pl. 15, figs. 18, 19 (1897).
curvicauda Blatchl. (nec DeGeer), Proc. Ind. acad. sc., 1892, 99-100 (1894).
U. S. east of Great Plains.

SYMMETROPLEURA Brunner.

modesta Brunn., Monogr. Phaner., 246 (1878).
N. Carolina.

PLATYLYRA Scudder.

californica Scudd., Proc. amer. acad. arts sc., xxxiii, 288-289 (1898).
California.

Amblycoryphae.

AMBLYCORYPHA Stål.

huasteca Sauss., Rev. mag. zool, 1859, 205 (1859)—Phylloptera (Orophus).
Walk., Cat. Derm. salt. Brit. mus., ii, 382 (1869)—Orophus.
Brunn., Monogr. Phaner., 266 (1878).
caudata Scudd., Bost. journ. nat. hist., vii, 445 (1862)—Phylloptera.
Texas, Louisiana.

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AMBLYCORYPHA (Continued).

oblongifolia De Geer, Mém., iii, 445, pl. 38, fig. 2 (1773)—Locusta.
Goeze, Ent. beytr., ii, 98 (1778)—Gryllus (Tettigonia).
Burm., Handb, ent., ii, 693 (1838)—Phylloptera.
De Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Phylloptera).
Walk., Cat. Derm. salt. Brit. mus., ii, 381 (1869)—Orophus.
Stål, Rec. Orth., ii, 42 (1874).
Caulf., Can. rec. sc., ii, 396 (1887)—Phylloptera (Amblycorypha).
Northern U. S. and Canada, east of Great Plains.

parvipennis Stål, Bih. sv. vet -akad. handl., iv, no 5, 58 (1876).
Texas.

rotundifolia Scudd., Bost. journ. nat. hist., vii, 445 (1862)—Phylloptera.
Walk., Cat. Derm. salt. Brit. mus., ii, 382 (1869)—Orophus.
Scudd., Proc Bost. soc. nat. hist., xix, 83 (1877).
oblongifolia Harr. (nec De Geer), Hitchc., Rep. geol. Mass., 582 (1833)—Gryllus (Pterophylla).
U. S. east of Great Plains.

scudderi Brun., Can. ent., xxiii, 73 (1891).
Nebraska.

uhleri Stål, Bih. sv. vet.-akad. handl., iv, no 5, 57 (1876).
New Jersey to Minnesota and Texas.

Microcentra.

MICROCENTRUM Scudder.

laurifolium Linn., Syst. nat., 10 ed., i, 429 (1758)—Gryllus (Tettigonia).
Fabr., Syst. ent., 282 (1775)—Locusta.
Serv., Orth., 404 (1839)—Phylloptera.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Phylloptera).
Walk , Cat. Derm. salt. Brit. mus., ii, 382 (1869)—Orophus.
Stål, Rec. Orth., ii, 42 (1874).
fol. lauri Linn., Mus. Adolph. Fred., 83 (1754)—Gryllus.
rhombifolium Sauss., Rev. mag. zool., 1859, 204 (1859)—Phylloptera (Orophus).
affiliatum Scudd., Bost. journ. nat. hist., vii, 447 (1862).
U. S. east of Rocky Mts.

retinerve Burm., Handb. ent., ii, 692 (1838)—Phylloptera.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Phylloptera).

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Scudd., Bost. journ. nat. hist., vii, 446 (1862).
Davis, Rep. ent. soc. Ont., xviii, 43 (1886)—Amblycorypha.
salicifolium Sauss., Rev. mag. zool., 1859, 204 (1859)—Phylloptera (Orophus).
totonacum Sauss., Ibid., 1859, 204 (1859)—Phylloptera (Orophus).
U. S. east of Great Plains.

PSEUDOPHYLLINAE.

BLIASTES Stål.

sp. indet. Scudd., Psyche, viii, 71 (1897).
Introduced: Missouri.

CYRTOPHYLLUS Burmeister.

perspicillatus Linn., Cent. ins. rar., 15 (1763)—Gryllus.
Linn., Amoen. acad., vi, 398 (1763)—Gryllus (Locusta).
Fabr., Syst. ent., 283 (1775)—Locusta.
Goeze, Ent. beytr, ii, 93 (1778)—Gryllus (Tettigonia).
Burm., Handb. ent., ii, 697 (1838).
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Cyrtophyllus).
hypericifolius Stoll', Répr. Spectres, Reg., 10, pl. 3a, fig. 9 (1813)—Gryllus (Tettigonia).
concavus Harr., Encycl. amer., viii, 42 (1835)—Pterophyllum.
zimmermanni Sauss., Rev. mag. zool., 1859, 206 (1859)—Platyphyllum.
U. S. east of Rocky Mts.

CONOCEPHALINAE.

Conocephalini.

COPIOPHORA Serville.

mucronata Thom., Glov., Rep. U. S. dep. agric., 1871, 80, fig. 14 (1871)—undescribed.
Thom., Can. ent., iv, 16 (1872).
Introduced: District of Columbia.

BELOCEPHALUS Scudder.

subapterus Scudd., Proc. Bost. soc. nat. hist., xvii, 459 (1875).
Florida.

PYRGOCORYPHA Stål.

uncinata Harr., Ins. inj. veg., 132 (1841)—Conocephalus.
Redt., Verh. zool.-bot. ges. Wien, 1891, 373 (1891).
N. Carolina to Texas.

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CONOCEPHALUS Thunberg.

acutulus Scudd., Proc. Bost soc. nat. hist , xx, 89 (1879).
California

atlanticus Brun., Ent. news, x, 38-39 (1899).
New Jersey to Virginia.

attenuatus Scudd., Rep. U. S. geol. surv. Nebr., 249 (1871).
Iowa, Nebraska.

crepitans Scudd., Bost. journ nat. hist., vii, 450 (1862.)
Iowa to Texas.

ensiger Harr., Ins. inj. veg., 131 (1841).
? *acuminatus* Stoll', Répr. spectr., Saut. à sabr , 18, 19, pl. 8a, fig. 27-29 (1787-1813)—Gryllus (Tettigonia).
Northern U. S. east of Rocky Mts.

exiliscanorus Davis, Rep. ent. soc. Ont., xviii, 43 (1886).
New York.

fuscostriatus Redt., Verh. zool.-bot. ges. Wien, 1891, 399 (1891).
Southern U. S. east of Rocky Mts

malivolans Scudd., Proc. Bost. soc. nat. hist., xx, 90 (1879).
Florida.

mexicanus Sauss., Rev. mag. zool., 1859, 208 (1859).
? *aries* Scudd., Proc. Bost. soc. nat. hist, xx, 91 (1879).
Georgia to Texas.

nebrascensis Brun., Can. ent., xxiii, 72-73 (1891).
Upper Mississippi Valley.

nietoi Sauss., Rev. mag. zool., 1859, 208 (1859).
hebes Scudd., Proc. Bost. soc. nat. hist., xx, 92 (1879).
Texas, Louisiana.

obscurellus Redt., Verh. zool.-bot. ges. Wien, 1891, 397-398 (1891).
Louisiana.

palustris Blatchl., Can. ent., xxv, 89-90 (1893).
Indiana.

retusus Scudd., Proc. Bost. soc. nat hist, xx, 93 (1879).
? *gladiator* Redt., Verh. zool.-bot. ges. Wien, 1891, 406 (1891).
Georgia; New Jersey?

robustus Scudd., Bost. journ. nat. hist., vii, 449 (1862).
Northern U. S. east of Rocky Mts.

triops Linn., Syst. nat., 10 ed., i, 430 (1758)—Gryllus (Tettigonia).
Fabr., Syst. ent., 285 (1775)—Locusta.
Thunb., Mém. acad. St. Petersb., v, 272 (1815).

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obtusus Burm., Handb. ent., ii, 705 (1838).
dissimilis Serv., Orth., 518 (1839).
U. S. east of Great Plains, except northward.

Xiphidiini.

ORCHELIMUM Serville.

agile De Geer, Mém., iii, 457, pl. 40, fig. 3 (1773)—Locusta.
Goeze, Ent. beytr., ii, 99 (1778)—Gryllus (Tettigonia).
Turt., Syst. nat. Linn., ii, 555 (1806)—Gryllus (Locusta).
Harr., Hitchc., Rep. geol. Mass., 582 (1833)—Gryllus (Pterophylla).
Burm., Handb. ent., ii, 707 (1838)—Xiphidium.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Xiphidium).
Scudd., Bost. journ. nat. hist., vii, 453 (1862).
Redt., Verh. zool.-bot. ges. Wien, 1891, 500-501 (1891)—Xiphidium (Orchelimum).
glaucum Serv., Orth., 524 (1839).
vulgare Harr., Ins. inj. veg., 130 (1841).
U. S. and Canada, from Rocky Mts. to Atlantic.

bruneri Blatchl., Can. ent., xxv, 92-93 (1893).
Indiana.

campestre Blatchl., Can. ent., xxv, 91-92 (1893).
Indiana, Minnesota.

cuticulare Redt., Verh. zool.-bot. ges. Wien, 1891, 503 (1891)—Xiphidium (Orchelimum).
Texas.

delicatum Brun., Ent. news, iii, 264-265 (1892).
Nebraska.

glaberrimum Burm., Handb. ent., ii, 707 (1838)—Xiphidium.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Xiphidium).
Scudd., Bost. journ. nat. hist., vii, 453 (1862).
Redt., Verh. zool.-bot. ges. Wien, 1891, 501 (1891)—Xiphidium (Orchelimum).
U. S. from Rocky Mts. eastward.

gladiator Brun., Can. ent., xxiii, 71-72 (1891).
Nebraska.

herbaceum Serv., Orth., 524 (1839).
concinnum Scudd., Bost. journ. nat. hist., vii, 452 (1862).
Massachusetts to Nebraska.

indianense Blatchl., Can. ent., xxv, 90-91 (1893).
Indiana.

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ORCHELIMUM (Continued).

laticauda Redt., Verh. zool.-bot. ges. Wien, 1891,504 (1891)—Xiphidium (Orchelimum).

Louisiana.

longipenne Scudd., Bost. journ. nat. hist., vii, 453 (1862).

Osb., Proc Iowa acad. sc., i, pt. 2, 119 (1892).—Xiphidium.

inerme Redt., Verh. zool.-bot. ges. Wien, 1891, 501-502 (1891)—Xiphidium (Orchelimum).

Iowa to Texas.

minor Brun., Can. ent., xxiii, 72 (1891).

District of Columbia.

nigripes Scudd., Proc. Bost. soc. nat. hist., xvii, 459 (1875).

Redt., Verh. zool.-bot. ges. Wien, 1891, 502-503 (1891)—Xiphidium (Orchelimum).

Garm., Orth. Ky., 7 (1894)—Xiphidium.

Rocky Mts. to Mississippi River.

nitidum Redt., Verh. zool.-bot. ges. Wien, 1891, 503 (1891)—Xiphidium (Orchelimum).

Georgia.

robustum Redt., Verh. zool.-bot. ges. Wien, 1891, 499-500 (1891)—Xiphidium (Orchelimum).

Brun., Publ. Nebr. acad. sc., iii, 30 (1893).

Nebraska to Louisiana.

silvaticum McNeill, Psyche, vi, 26 (1891).

Illinois, Indiana.

spinulosum Redt., Verh. zool.-bot. ges. Wien, 1891, 503-504 (1891)—Xiphidium (Orchelimum).

North Carolina.

volantum McNeill, Psyche, vi, 26-27 (1891).

Illinois.

XIPHIDIUM Serville.

attenuatum Scudd., Trans. amer. ent. soc., ii, 305 (1869).

Indiana to Nebraska and Minnesota.

brevipenne Scudd., Can. nat., vii, 285 (1862).

U. S. and Canada from Rocky Mts. to Atlantic.

ensiferum Scudd., Bost. journ. nat. hist., vii, 451 (1862).

Mississippi Valley.

fasciatum De Geer, Mém., iii, 458, pl. 40, fig. 4 (1773)—Locusta.

Goeze, Ent. beytr., ii, 99 (1778)—Gryllus (Tettigonia).

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Turt., Syst. nat. Linn., ii, 555 (1806)—Gryllus (Locusta).
Serv., Ann. sc. nat., xxii, 159 (1831).
Harr., Hitchc., Rep. geol. Mass., 582 (1833)—Gryllus (Pterophylla).
Ashm., Ins. life, vii, 26 (1894)—Orchelimum.
cinereum Thunb., Mém. acad. St. Petersb., v, 273 (1815)—Conocephalus).
gracile Harr., Ins. inj. veg., 131 (1841)—Orchelimum.
U. S. and Canada from Rocky Mts. to Atlantic.

gossypii Scudd., Proc. Bost. soc. nat. hist., xvii, 462 (1875).
Ashm., Ins. life, vii, 26 (1894)—Orchelimum.
Nebraska to Texas and Mississippi.

lanceolatum Brun., Can. ent., xxiii, 59 (1891).
Iowa.

nemorale Scudd., Proc. Bost. soc. nat. hist., xvii, 462 (1875).
curtipenne Redt., Verh. zool.-bot. ges. Wien, 1891, 522 (1891).
Upper Mississippi Valley.

nigropleura Brun., Can. ent., xxiii, 58-59 (1891).
New York to Nebraska and Minnesota.

saltans Scudd., Rep. U. S. geol. surv. Nebr., 249 (1871).
modestum Brun., Can. ent., xxiii, 56-57 (1891).
taeniatum Redt., Verh. zool.-bot. ges. Wien, 1891, 520 (1891).
Rocky Mts. to Mississippi.

scudderi Blatchl., Can. ent., xxiv, 26-27 (1892).
Indiana.

strictum Scudd., Proc. Bost. soc. nat. hist., xvii, 460 (1875).
Mississippi Valley.

DECTICINAE.

ENGONIASPIS Brunner.

testacea Scudd. (See Appendix.)
Missouri.

ATLANTICUS Scudder.

dorsalis Burm., Handb. ent., ii, 713 (1838)—Decticus.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Ephippigera).
Scudd., Bost. journ. nat. hist., vii, 454 (1862)—Thyreonotus.
Scudd., Can. ent., xxvi, 179, 180, 183 (1894).
Atlantic states, Indiana.

gibbosus Scudd., Can. ent., xxvi, 180 (1894).
N. Carolina to Florida.

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ATLANTICUS (Continued).

pachymerus Burm., Handb. ent., ii, 712 (1838)—Decticus.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Ephippigera).
Scudd., Bost. journ. nat. hist., vii, 453 (1862)—Thyreonotus.
Scudd., Can. ent., xxvi, 179, 180, 183 (1894).
Ball, Proc. Iowa acad. sc., iv, 237 (1897)—Pterolepis.
derogatus Walk., Cat. Derm. salt. Brit. mus., ii, 260 (1869)—Decticus.
U. S. east of Great Plains.

CAPNOBOTES Scudder.

bruneri Scudd., Can. ent., xxix, 74 (1897).
California.
fuliginosus Thom., Ann. rep. U. S. geol. surv. terr., v, 443, pl. 1, fig. 9 (1872)—Locusta.
Scudd., Can. ent., xxix, 74 (1897).
Arizona.
occidentalis Thom., Ann. rep. U. S. geol. surv. terr., v, 444, pl. 2, fig. 16 (1872)—Locusta.
Scudd., Can. ent., xxix, 74 (1897).
Utah, Nevada, California.

APOTE Scudder.

notabilis Scudd., Can. ent., xxix, 73 (1897).
Oregon.

ORCHESTICUS Saussure.

americanus Sauss., Rev. mag. zool., 1859, 201 (1859).
Tennessee.
cragini Brun., Bull. Washb. coll., i, 129 (1885)—Thyreonotus.
Scudd., Can. ent., xxvi, 180, 183 (1894).
Nebraska to Texas.
haldemanii Gir., Marcy, Expl. Red River, 259, pl. 15, fig. 5-8 (1853)—Anabrus.
Thom., Ann. rep. U. S. geol. surv. terr., v, 441 (1872)—Pterolepis.
Brun., Publ. Nebr. acad. sc., iii, 31 (1893)—Thyreonotus.
Scudd., Can. ent., xxvi, 180, 183 (1894).
Wyoming to Arkansas.
minutus Thom., Proc. acad. nat. sc. Philad., 1870, 75 (1870)—Anabrus.
Thom., Ann. rep. U. S. geol. surv. terr., v, 441 (1872)—Pterolepis.

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Scudd., Can. ent., xxvi, 180, 183 (1894).
Nebraska, Colorado, New Mexico.

scudderi Brun., Bull. Washb. coll., i, 129-130 (1885)—Thyreonotus.
Scudd., Can. ent., xxvi, 180, 183 (1894).
Kansas, Nebraska.

stevensoni Thom., Proc. acad. nat. sc. Philad., 1870, 75 (1870)—Anabrus.
Thom., Ann. rep. U. S. geol. surv. terr., v, 441 (1872)—Pterolepis.
Scudd., Can. ent., xxvi, 180, 183 (1894).
Colorado, New Mexico.

TROPIZASPIS Brunner.

castanea Scudd., Proc. amer. acad. arts sc., xxxv, 85, 86-87 (1899).
California.

diabolica Scudd., Proc. amer. acad. arts sc., xxxv, 86, 88-89 (1899).
California.

ovata Scudd., Proc. amer. acad. arts sc., xxxv, 85, 86 (1899).
California.

picturata Scudd., Proc. amer. acad. arts sc., xxxv, 85,87-88 (1899).
Washington.

steindachneri Herm., Verh. zool.-bot. ges. Wien, xxiv, 204, pl. 6, fig. 98-102 (1874)—Arytropteris.
Scudd., Can. ent., xxvi, 180, 183 (1894).
Pacific Coast, Texas; Nebraska?

ANABRUS Haldeman.

coloradus Thom., Ann. rep. U. S. geol. surv. terr., v, 440 (1872).
Manitoba, Nebraska, Kansas, Colorado, New Mexico, Texas.

purpurascens Uhl., Proc. ent. soc. Philad., ii, 550 (1864).
Thom., Proc. acad. nat. sc. Philad., 1870, 76 (1870)—Thamnotrizon.
similis Scudd., Rep. U. S. geol. surv. Nebr., 249 (1872).
Washington and Manitoba south through Rocky Mts. to Texas.

simplex Hald., Stansb., Expl. Utah, 372, pl. 10, fig. 4 (1852).
Rocky Mts. to Sierra Nevadas.

PERANABRUS Scudder.

scabricollis Thom., Ann. rep. U. S. geol. surv. terr., v, 441, (1872)—Thamnotrizon.
Scudd., Can. ent., xxvi, 181, 183 (1894).
Montana.

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CACOPTERIS Scudder.

aequalis Scudd., Proc. amer. acad. arts sc., xxxv, 90, 94 (1899).
California.

femorata Scudd., Proc. amer. acad. arts sc., xxxv, 90, 95 (1899).
California.

fuscopunctata Scudd., Proc. amer. acad. arts sc., xxxv, 90, 91-92 (1899).
California.

inermis Scudd., Proc. amer. acad. arts sc., xxxv, 90, 91 (1899).
Western Nevada.

nevadensis Scudd., Proc. amer. acad. arts sc., xxxv, 90, 93-94 (1899).
Nevada.

sinuata Scudd., Proc. amer. acad. arts sc., xxxv, 90, 92 (1899).
Arizona.

EREMOPEDES Scudder.

scudderi Cock., Ann. mag. nat. hist., (7), ii, 323-324 (1898).
New Mexico.

unicolor Scudd. (See Appendix.)
Arizona.

IDIOSTATUS Pictet.

bilineatus Thom., Rep. U. S. geol. surv. west 100 mer., v, 905 (1875) —Steiroxys.
Scudd., Can. ent., xxvi, 181, 183 (1894).
Arizona?, California.

hermani Thom., Rep. U. S. geol. surv. west 100 mer., v, 904, pl. 44, fig. 4 (1875)—Steiroxys.
Scudd., Can. ent., xxvi, 181, 183 (1894).
californicus Pict.; Mém. soc. phys. hist. nat. Gen., xxx, pt. 6, 64-65, pl. 3, figs. 35, 35ab (1888).
Yellowstone Park, California.

STEIROXYS Herman.

borealis Scudd., Can. ent., xxvi, 182 (1894).
Alberta, Oregon, California.

pallidipalpus Thom., Ann. rep. U. S. geol. surv. terr., v, 442 (1872) —Decticus.
Scudd., Can. ent., xxvi, 182, 183 (1894).
Utah, Nevada, Idaho.

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trilineata Thom., Proc. acad. nat. sc. Philad., 1870, 76 (1870)—Thamnotrizon.
Thom., Ann. rep. U. S. geol. surv. terr., v, 443 (1872)—Decticus.
Herm., Verh. zool.-bot. ges. Wien, xxiv, 207, pl. 5, fig. 64-69 (1874).
Wyoming, Utah, Colorado, New Mexico.

IDIONOTUS Scudder.

brunneus Scudd. (See Appendix.)
California.

CLINOPLEURA Scudder.

melanopleura Scudd., Ann. rep. chief eng., 1876, 500 (1876)—Steiroxys.
Scudd., Can. ent., xxvi, 182, 183 (1894).
California, Utah.

PLAGIOSTIRA Scudder.

albonotata Scudd., Ann. rep. chief eng., 1876, 501 (1876).
New Mexico.

ATELOPLUS Scudder.

notatus Scudd. (See Appendix.)
California.

GRYLLACRINAE.

CAMPTONOTUS Uhler.

carolinensis Gerst., Arch. naturg., xxvi, 276 (1860)—Gryllacris.
Brunn., Monogr. Stenop., 137 (1888)—Neortus.
scudderi Uhl., Proc. ent. soc. Philad., ii, 549 (1864).
Maryland to Carolina.

STENOPELMATINAE.

(*Stenopelmatini.*)

Stenopelmati.

STENOPELMATUS Burmeister.

californicus Brunn., Monogr. Stenop., 17, fig. 1abc (1888).
British Columbia to California.

fasciatus Thom., Ann. rep. U. S. geol. surv. terr., v, 434 (1872).
Idaho.

histrio Sauss., Rev. mag. zool., 1859, 210 (1859).
California.

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STENOPALMATUS (Continued).

irregularis Brunn., Monogr. Stenop., 17 (1888).
Arizona, California, Nevada.

longispina Brunn., Monogr. Stenop., 16-17, fig. 1d (1888).
British Columbia to California.

oculatus Scudd., Bull. U. S. geol. surv. terr., ii, 261 (1876).
hydrocephalus Brunn., Monogr. Stenop., 17-18 (1888).
U. S. west of 100th meridian.

pictus Scudd., Can. ent., xxxi, 114, 116-117 (1899).
California.

Anostostomata.

CYPHODERRIS Uhler.

monstrosa Uhl., Proc. ent. soc. Philad., ii, 552 (1864).
Oregon to Wyoming, Alberta.

(*Rhaphidophorini.*)

Rhaphidophorae.

DIESTRAMMENA Brunner.

marmorata Haan, Bijdr. kenn. Orth., 217 (1842)—Locusta (Rhaphidophorus).
Brunn., Monogr. Stenop., 55, fig. 26 (1888).
Introduced: Minnesota.

Tropidischiae.

TROPIDISCHIA Scudder.

xanthostoma Scudd., Proc. Bost. soc. nat. hist., viii, 12 (1861)—Rhaphidophora.
Scudd., Bost. journ. nat. hist., vii, 411 (1862).
Oregon, California.

Ceuthophili.

HADENOECUS Scudder.

cavernarum Sauss., Ann. soc. ent. France, (4), i, 492 (1860)—Rhaphidophora.
Scudd., Proc. Bost. soc. nat. hist., xii, 409 (1869).
subterraneus Scudd., Proc. Bost. soc. nat. hist., viii, 8 (1861)—Rhaphidophora.

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Scudd., Bost. journ. nat. hist., vii, 441 (1862).
Caves of Kentucky, Tennessee and Virginia.

puteanus Scudd., Proc. Bost. soc. nat. hist., xix, 37 (1877).
N. Carolina, Mississippi.

CEUTHOPHILUS Scudder.

agassizii Scudd., Proc. Bost. soc. nat. hist., viii, 11 (1861)—Rhaphidophora.
Scudd., Bost. journ. nat. hist., vii, 439 (1862).
zonarius Walk., Cat. Derm. salt. Brit. mus., i, 203 (1869).
British Columbia, Washington.

alpinus Scudd., Proc. amer. acad. arts sc., xxx, 30, 78-79 (1894).
Colorado.

arizonensis Scudd., Proc. amer. acad. arts sc, xxx, 26, 52-53 (1894).
Utah, Arizona, New Mexico.

bicolor Scudd., Proc. amer. acad. arts sc., xxx, 28, 72-73 (1894).
Kentucky.

blatchleyi Scudd., Proc. amer. acad. arts sc., xxx, 26, 57-58 (1894).
uhleri Blatchl. (nec Scudd.), Proc. Ind. acad. arts sc., 1892, 144-145 (1894).
New York, Indiana, Minnesota, Iowa.

brevipes Scudd., Bost. journ. nat. hist., vii, 434 (1862).
New Brunswick to Indiana.

bruneri Scudd., Proc. amer. acad. arts sc., xxx, 29, 79-80 (1894).
divergens Osb. (nec Scudd.), Proc. Iowa acad. sc., i, ii, 119 (1892).
Iowa to Texas.

caecus Scudd., Proc. amer. acad. arts sc., xxx, 28, 60-61 (1894).
Kentucky, Missouri.

californianus Scudd., Bost. journ. nat. hist., vii, 438 (1862).
castaneus Thom., Ann. rep. U. S. geol. surv. terr., v, 435 (1872).
denticulatus Scudd., Ann. rep. U. S. geol. surv. west 100 mer., 1876, 279 (1876).
Oregon, California, Utah, Arizona.

celatus Scudd., Proc. amer. acad. arts sc., xxx, 26, 48-49 (1894).
British Columbia to California.

corticicola Scudd., Proc. amer. acad. arts sc., xxx, 25, 41 42 (1894).
Texas.

crassus Scudd., Proc. amer. acad. arts sc., xxx, 30, 85-86 (1894).
Southwestern states.

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CEUTHOPHILUS (Continued).

devius Scudd., Proc. amer. acad. arts sc., xxx, 30, 99-100 (1894).
Kansas, Nebraska, Upper Missouri River.

discolor Scudd., Proc. amer. acad. arts sc., xxx, 29, 88-90 (1894).
Kansas, Nebraska.

divergens Scudd., Bost. journ. nat. hist., vii, 436 (1862).
Nebraska.

ensifer Pack., Amer. nat., xv, 882, pl. 7, figs. 4, 4ab (1881).
Tennessee.

fusiformis Scudd., Proc. amer. acad. arts sc., xxx, 28, 62-63 (1894).
Nebraska.

gracilipes Hald., Proc. amer. ass. adv. sc., ii, 346 (1850)—Phalangopsis.
Scudd., Proc. Bost. soc. nat. hist., viii, 7 (1861)—Rhaphidophora.
Scudd., Bost. journ. nat. hist., vii, 439 (1862).
Eastern U. S., Manitoba.

grandis Scudd., Proc. amer. acad. arts sc., xxx, 24, 38-39 (1894).
Tennessee, New York.

henshawi Scudd., Proc. amer. acad. arts sc., xxx, 30, 97-99 (1894).
British Columbia to California.

heros Scudd., Proc. amer. acad. arts sc., xxx, 26, 54-56 (1894).
New York to N. Carolina.

inquinatus Scudd., Proc. amer. acad. arts sc., xxx, 27, 87-88 (1894).
divergens (pars) Brun. (nec Scudd.), Publ. Nebr. acad sc., iii, 32 (1893).
Nebraska.

lapidicola Burm., Handb. ent., ii, 723 (1838)—Phalangopsis.
Haan, Bijdr. kenn. Orth., 178 (1842)—Locusta (Rhaphidophorus).
Scudd., Proc. amer. acad. arts sc., xxx, 26, 50-51 (1894).
New York to S. Carolina.

latebricola Scudd., Proc. amer. acad. arts sc., xxx, 24, 37-38 (1894).
Pennsylvania to W. Virginia and Kentucky.

latens Scudd., Bost. journ. nat. hist., vii, 437 (1862).
New York to Texas.

latibuli Scudd., Ins. life, vi, 313-314 (1894).
Georgia, Florida.

maculatus Harr., Ins. inj. veg., 126 (1841)—Rhaphidophora.
Harr., Ibid., 2d ed., 137 (1852)—Phalangopsis.
Scudd. (pars), Bost. journ. nat. hist., vii, 434 (1862).

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lapidicola Uhl. (nec Burm.), Harr., Ins. inj. veg., 3d ed., 155 (1862) —Phalangopsis.

Northern U. S. and Canada, east of Great Plains.

neglectus Scudd., Proc. amer. acad. arts sc., xxx, 30, 67-68 (1894).

maculatus (pars) Scudd. (nec Harr.), Bost. journ. nat. hist., vii, 434 (1862).

New England to Virginia.

neomexicanus Scudd., Proc. amer. acad. arts sc., xxx, 30, 100-101 (1894).

New Mexico.

nigricans Scudd., Proc. amer. acad. arts sc., xxx, 28, 61-62 (1894).

Kentucky.

nodulosus Brunn., Monogr. Stenop., 64, fig. 33a (1888).

Nebraska to Texas.

occultus Scudd., Proc. amer. acad. arts sc., xxx, 28, 77-78 (1894).

Georgia.

pacificus Thom., Ann. rep. U. S. geol. surv. terr., v, 436 (1872).

unispinosus Brunn., Monogr. Stenop., 64 (1888).

California, Nevada.

pallescens Brun., Can. ent., xxiii, 37-38 (1891).

Nebraska, Wyoming.

pallidus Thom., Ann. rep. U. S. geol. surv. terr., v, 434 (1872).

Rocky Mt. region.

palmeri Scudd., Proc. amer. acad. arts sc., xxx, 25, 40-41 (1894).

Texas.

pinguis Scudd., Proc. amer. acad. arts sc., xxx, 29, 86-87 (1894).

Texas.

polluticornis Scudd., Can. ent., xxxi, 118-119 (1899).

California.

salebrosus Scudd., Can. ent., xxxi, 120-121 (1899).

Washington.

sallei Scudd., Proc. amer. acad. arts sc., xxx, 28, 63-64 (1894).

Louisiana.

scabripes Hald., Proc. acad. nat. sc. Philad., vi, 364 (1853)—Phalangopsis.

Scudd., Proc. Bost. soc. nat. hist., viii, 7 (1861)—Rhaphidophora.

Scudd., Bost. journ. nat. hist., vii, 436 (1862).

Alabama.

seclusus Scudd., Proc. amer. acad. arts sc., xxx, 25, 45-46 (1894).

Iowa, Nebraska.

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CEUTHOPHILUS (Continued).

secretus Scudd., Proc. amer. acad. arts sc., xxx, 24, 39-40 (1894).
Texas.

silvestris Brun., Bull. Washb. coll., i, 126-127 (1885).
Kansas.

spinosus Scudd., Proc. amer. acad. arts sc., xxx, 27, 58-59 (1894).
lapidicola Brunn., (nec Burm.), Monogr. Stenop., 62-64 (1888).
Georgia.

stygius Scudd., Proc. Bost. soc. nat. hist., viii, 9 (1861)—Rhaphidophora.
Scudd., Bost. journ. nat. hist., vii, 438 (1862).
sloanii Pack., Ann. rep. Peab. acad. sc., v, 93-94 (1873).
Kentucky, Indiana.

tenebrarum Scudd., Proc. amer. acad. arts sc., xxx, 29, 70-72 (1894).
latens McNeill (nec Scudd.), Psyche, vi, 27 (1891).
Illinois to N. Carolina.

terrestris Scudd., Proc. amer. acad. arts sc., xxx, 26, 46-47 (1894).
lapidicola Scudd. (nec Burm.), Proc. Bost. soc. nat. hist., viii, 7, (1861) —Rhaphidophora.
Northern U. S. and Canada, east of Mississippi River.

testaceus Scudd., Proc. amer. acad. arts sc., xxx, 30, 92-93 (1894).
Missouri, Nebraska, Wyoming, California.

uhleri Scudd., Bost. journ. nat. hist., vii, 435 (1862).
latisulcus Blatchl., Proc. Ind. acad. sc., 1892, 146 (1894)
Middle states.

uniformis Scudd., Proc. amer. acad. arts sc., xxx, 26, 53-54 (1894).
pallidus Scudd. (nec Thom.), Bull. U. S. geol. surv. terr., ii, 261 (1876).
Nebraska to New Mexico.

utahensis Thom., Proc. Dav. acad. nat. sc., i, 264, pl. 36, fig. 8 (1876).
Utah.

valgus Scudd., Proc. amer. acad. arts sc., xxx, 27, 74-75 (1894).
Colorado.

varicator Scudd., Proc. amer. acad. arts sc., xxx, 25, 42-43 (1894).
Texas.

variegatus Scudd., Proc. amer. acad. arts sc., xxx, 24, 31-32 (1894).
Texas.

vinculatus Scudd., Proc. amer. acad. arts sc., xxx, 29, 91-92 (1894).
Montana and Nebraska to California and Washington.

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HEMIUDEOPSYLLA Saussure-Pictet.

californiana Sauss.-Pict.(excl.syn.), Biol. centr.amer., Orth., 302(1897).
California.

platyceps Sauss.-Pict., Biol. centr. amer., Orth., 302 (1897).
California.

PHRIXOCNEMIS Scudder.

bellicosus Scudd., Proc. amer. acad. arts sc., xxx, 103, 106-107 (1894).
Colorado.

truculentus Scudd., Proc. amer. acad. arts sc., xxx, 103-105 (1894).
Nebraska, Colorado.

validus Scudd., Proc. amer. acad. arts sc., xxx, 103, 105-106 (1894).
California.

DAIHINIA Haldeman.

brevipes Hald., Proc. amer. ass. adv. sc., ii, 346 (1850)—Phalangopsis (Daihinia).
Gir., Marcy, Expl. Red River, 257, pl. 15, figs. 9-13 (1853).
Eastern margin of Rocky Mts.

gigantea Brun., Bull. Washb. coll., i, 127 (1885).
Brun., Can. ent., xxiii, 39 (1891)—Udeopsylla.
Nebraska to Indian Territory.

UDEOPSYLLA Scudder.

nigra Scudd., Can. nat., vii, 284-285 (1862).
Scudd., Bost. journ. nat. hist., vii, 437 (1862)—Ceuthophilus.
Mississippi River to Rocky Mts., Illinois, Arizona, California.

robusta Hald., Proc. amer. ass. adv. sc., ii, 346 (1850)—Phalangopsis (Daihinia).
Gir., Marcy, Expl. Red River, 257 (1853)—Daihinia.
Scudd., Bost. journ. nat. hist., vii, 442 (1862).
compacta Brun., Can. ent., xxiii, 38-39 (1891).
Mississippi River to Rocky Mts., California.

GAMMAROTETTIX Brunner.

bilobatus Thom., Ann. rep. U. S. geol. surv. terr., v, 437 (1872)—Ceuthophilus.
Scudd , Proc. amer. acad. arts sc., xxx, 111 (1894).
californicus Brunn., Monogr. Stenop., 61, fig. 32 (1888).
California.

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GRYLLIDAE.

GRYLLOTALPINAE.

Gryllotalpini.

GRYLLOTALPA Linné.

borealis Burm., Handb. ent., ii, 740 (1838).
Haan, Bijdr. kenn. Orth., 225 (1842)—Gryllus (Gryllotalpa.)
Sauss., Miss. scient. Mex., Rech. zool., vi, 346 (1874)—Gryllotalpa (Curtilla).
americana Harr., Cat. ins. Mass., 56 (1835)—undescribed.
brevipennis Serv., Orth., 368 (1839).
longipennis Scudd. (nec Haan), Bost. journ. nat. hist., vii, 426 (1862).
columbia Scudd., Mem. Peab. acad. sc., i, 26, pl. 1, figs. 15, 36 (1869).
U. S. and Canada east of Rocky Mts.

cultriger Uhl., Proc. ent. soc. Philad., ii, 543 (1864).
Texas to California.

major Sauss., Miss scient. Mex., Rech. zool., vi, 343-344 (1874)—Gryllotalpa (Curtilla).
?*ponderosa* Brun., Bull. Washb. coll., i, 126 (1885).
Illinois, Kansas.

SCAPTERISCUS Scudder.

abbreviatus Scudd., Mem. Peab. acad. sc., i, 14-15, pl. 1, fig. 8, 20 (1869)
Southern Florida.

mexicanus Burm., Handb. ent., ii, 740 (1838)—Gryllotalpa.
Haan, Bijdr. kenn. Orth., 237 (1842)—Gryllus (Gryllotalpa).
Scudd., Mem. Peab. acad. sc., i, 9-10, pl. 1, fig. 6, 18 (1869).
Southern Florida.

Tridactylini.

TRIDACTYLUS Olivier.

apicalis Say, Journ. acad. nat. sc. Philad., iv, 310 (1825).
Uhl., Say, Ent. N. A., ed. LeC., ii, 239 (1859)—Xya.
Sauss., Miss. scient. Mex., Rech. zool., vi, 351 (1874)—Tridactylus (Xya).
tibialis Guér., Icon. règne anim., Ins., 336 (1829-1838).
U. S. east of Great Plains, except northernmost portions.

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fissipes Sauss., Rev. suisse zool., iv, 410, 418 (1897).
Carolina to Texas.

histrio Sauss., Biol. centr. amer., Orth., 207-208 (1897)—Tridactylus (Heteropus).
Texas.

histrionicus Sauss., Rev. suisse zool., iv, 410, 419 (1897).
Texas.

illinoiensis Thom., Proc. ent. soc. Philad., i, 104 (1862).
Illinois.

incertus Sauss., Rev. suisse zool., iv, 410, 418 (1897).
Texas.

minutus Scudd., Bost. journ. nat. hist., vii, 425 (1862).
Sauss., Miss. scient. Mex., Rech. zool., vi, 353 (1874)—Tridactylus (Heteropus).
Illinois and Minnesota to Florida and Texas.

mixtus Hald., Proc. acad. nat. sc. Philad., vi, 364 (1853)—Xya.
Walk., Cat. Derm. salt. Brit. mus., i, 113 (1869).
Sauss., Miss. scient. Mex., Rech. zool., vi, 353 (1874)—Tridactylus (Xya).
Carolina to Texas.

terminalis Uhl, Scudd., Bost. journ. nat. hist., vii, 425 (1892).
Sauss., Miss. scient. Mex., Rech. zool., vi, 352 (1874).
Massachusetts to Minnesota.

MYRMECOPHILA.

MYRMECOPHILINAE Latreille.

formicarum Scudd., Psyche, viii, 425, 426 (1899).
California.

nebrascensis Brun., Publ. Nebr. acad. sc., iii, 33 (1893)—undescribed.
Scudd., Psyche, viii, 425, 427-428 (1899).
Minnesota to New Mexico.

nehawkae Brun., Scudd., Psyche, viii, 425, 428 (1899).
Nebraska.

oregonensis Brun., Can. ent., xvi, 43 (1884).
British Columbia to Oregon.

pergandei Brun., Can. ent., xvi, 42-43, fig. 4ab (1884).
Southern Atlantic states.

MOGISOPLISTUS Serville.

slossoni Scudd., Psyche, viii, 55 (1897).
Florida.

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CYCLOPTILUS Scudder.

borealis Brun., Can. ent., xxiii, 37 (1891).
Nebraska.

squamosus Scudd., Proc. Bost. soc. nat. hist., xii, 142 (1868).
Texas.

GRYLLINAE.

NEMOBIUS Serville.

ambitiosus Scudd., Proc. Bost. soc. nat. hist., xix, 81 (1877).
Florida.

aterrimus Scudd., Journ. N. Y. ent. soc., iv, 99, 105 (1896).
Florida.

canus Scudd., Journ. N. Y. ent. soc., iv, 99, 103 (1896).
Texas.

carolinus Scudd., Proc. Bost. soc. nat. hist., xix, 36 (1877).
variegatus Brun., Publ. Nebr. acad. sc., iii, 32 (1893)—Cyrtoxiphus.
affinis Beut., Bull. amer. mus. nat. hist., vi, 249, 267, pl. 5, fig. 11 (1894).
Maine to Florida, Texas and Nebraska.

cubensis Sauss., Miss. scient. Mex., Rech. zool., vi, 384-385, pl. 7, fig. 5 (1874).
volaticus Scudd., Proc. Bost. soc. nat. hist., xix, 36 (1877).
Southern U. S. east of Great Plains; rarely in northern states; Maine, Illinois, Iowa.

fasciatus De Geer, Mém., iii, 522, pl. 43, fig. 5 (1773)—Gryllus.
Goeze, Ent. beytr., ii, 89 (1778)—Gryllus (Acheta).
Scudd., Bost. journ. nat. hist., vii, 430 (1862).
hospes Fabr., Syst. ent., 281 (1775)—Acheta.
servilis Say, Harr., Cat. ins. Mass., 56 (1835)—Acheta.
vittatus Harr., Ins. inj. veg., 123 (1841)—Acheta.
exiguus Scudd. (nec Say), Bost. journ. nat. hist., vii, 429 (1862).
? *marginatus* Murtf., Ins. life, v, 155 (1893).
Nova Scotia to North Carolina, westward to Great Plains.

mexicanus Walk., Cat. Derm. salt. Brit. mus., i, 57 (1869).
California.

mormonius Scudd., Journ. N. Y. ent. soc., iv, 100, 106 (1896).
Utah.

neomexicanus Scudd., Journ. N. Y. ent. soc., iv, 99, 104 (1896).
denticulatus Sauss., Biol. centr. amer., Orth., pl. 11, fig. 25 (1897).
California to Texas.

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pictus Scudd., Psyche, vii, 431, 433-434 (1896).
New Mexico.

socius Scudd., Proc. Bost. soc. nat. hist., xix, 37 (1877).
Gulf states.

utahensis Scudd., Journ. N. Y. ent. soc., iv, 99, 103-104 (1896).
Utah.

GRYLLUS Linné.

abbreviatus Serv., Orth., 336 (1839).
Harr., Ins. inj. veg., 122 (1841)—Acheta.
angustus Scudd., Bost. journ. nat. hist., vii, 427 (1862).
signatipes Walk., Cat. Derm. salt. Brit. mus., i, 22 (1869).
United States.

assimilis Fabr., Syst. ent., 280 (1775)—Acheta.
Goeze, Ent. beytr., ii, 87 (1778)—Gryllus (Acheta).
Oliv., Encycl. méth., vi, 634 (1791).
verticalis Serv., Orth., 343 (1839).
aztecus Sauss., Rev. mag. zool., 1859, 316 (1859).
cubensis Sauss., Ibid., 1859, 316 (1859).
lineaticeps Stål, Orth. Eug. resa, 314 (1861).
septentrionalis Walk., Cat. Derm. salt. Brit. mus., i, 18 (1869).
luridus Walk., Ibid., i, 18-19 (1869).
determinatus Walk., Ibid., i, 19-20 (1869).
?*parilis* Walk., Ibid., i, 20 (1869).
?*similaris* Walk., Ibid., i, 20 (1869).
mundus Walk., Ibid., i, 23-24 (1869).
signatus Walk., Ibid., i, 24 (1869).
vicarius Walk., Ibid., i, 24 (1869).
Southern U. S.

domesticus Linn., Syst. nat., i, 428 (1758)—Gryllus (Acheta).
De Geer, Mém., iii, 509-517, pl. 24, figs. 1-20 (1773).
Fabr., Syst. ent., 280 (1775)—Acheta.
transversalis Walk., Cat. Derm. salt. Brit. mus., v, suppl., 6 (1871).
U. S. and Canada east of Great Plains.

luctuosus Serv., Orth., 335 (1839).
Glov., Ill. N. A. ent., Orth., pl. 9, fig. 11 (1872)—Acheta.
U. S.

neglectus Scudd., Bost. journ. nat. hist., vii, 428 (1862).
scudderianus Sauss., Miss. scient. Mex., Rech. zool., vi, 402 (1874).
U. S. and Canada east of Rocky Mts.

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GRYLLUS (Continued).

pennsylvanicus Burm., Hand. ent., ii, 734 (1838).
Uhl., Harr., Ins. inj. veg., 3d ed., 152 (1862)—Acheta.
niger Harr., Ins. inj. veg., 123 (1841)—Acheta.
U. S.

personatus Uhl., Proc. ent. soc. Philad., ii, 547 (1864).
Kansas, Nebraska.

saussurei Scudd., Proc. Bost. soc. nat. hist., xix, 35 (1877).
Georgia.

GRYLLODES Saussure.

lineatus Scudd., Ann. rep. chief eng., 1876, 499 (1876).
Sauss., Mél. Orth., ii, 363 (1877)—Gryllus.
Arizona.

OECANTHINAE.

OECANTHUS Serville.

angustipennis Fitch, Trans. N. Y. st. agric. soc., xvi, 411 (1856).
New York to Kentucky and Nebraska.

argentinus Sauss., Biol. centr. amer., Orth., 253-254 (1897).
Texas.

bipunctatus De Geer, Mém., 523, pl. 43, fig. 7 (1773)—Gryllus.
Goeze, Ent. beytr., ii, 89 (1778)—Gryllus (Acheta).
Serv., Ann. sc. nat., xxii, 135 (1831).
Harr., Hitchc., Rep. geol. Mass., 576 (1835)—Acheta.
Haan, Bijdr. kenn. Orth., 225 (1842)—Gryllus (Oecanthus).
Riley, Bull. U. S. ent. comm., vi, 61-62 (1881)—Xabea.
binotatus Gmel., Linn., Syst. nat., i, iv, 2062 (1788)—Gryllus (Acheta).
punctulatus Fitch, Trans. N. Y. st. agric. soc., xvi, 413 (1856).
U. S. east of Great Plains, except northernmost portions.

californicus Sauss., Miss scient. Mex., Rech. zool., vi, 462 (1874).
California.

fasciatus Fitch, Trans. N. Y. st. agric. soc., xvi, 412 (1856).
Northern U. S. east of Great Plains.

latipennis Riley, Bull. U. S. ent. comm., vi, 61 (1881).
U. S. east of Great Plains.

nigricornis Walk., Cat. Derm. salt. Brit. mus., i, 93 (1869).
New York to Nebraska.

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niveus De Geer, Mém., iii, 522, pl. 43, fig. 6 (1773)—Gryllus.
Goeze, Ent. beytr., ii, 89 (1778)—Gryllus (Acheta).
Serv., Ann. sc. nat., xxii, 135 (1831).
Harr., Hitchc., Rep. geol. Mass., 582 (1833)—Acheta.
Haan, Bijdr. kenn. Orth, 225 (1842)—Gryllus (Oecanthus).
discoloratus Fitch, Trans. N. Y. st. agric. soc., xvi, 411 (1856).
fuscipes Fitch, Ibid., xvi, 411 (1856).
U. S. and Canada.

pini Beut., Journ. N. Y. ent. soc., ii, 56 (1894).
Connecticut.

quadripunctatus Beut., Bull. amer. mus. nat. hist., vi, 250-251, 271, fig. 5 (1894).
New York to Indiana.

TRIGONIDIINAE.

ANAXIPHA Saussure.

exigua Say, Journ. acad. nat. sc. Philad., iv, 309 (1825)—Acheta.
Walk., Cat. Derm. salt. Brit. mus., i, 57 (1869)—Nemobius.
Scudd., Proc. Bost. soc. nat. hist., xix, 82 (1877).
pulicaria Burm., Handb. ent., ii, 732 (1838)—Gryllus.
New York to Texas.

CYRTOXIPHA Brunner.

delicatula Scudd., Proc. Bost. soc. nat. hist., xix, 82 (1877).
Florida.

gundlachi Sauss., Miss. scient. Mex., Rech. zool., vi, 373-375 (1874).
Southern U. S.

PHYLLOSCIRTUS Guérin.

pulchellus Uhl., Proc. ent. soc. Philad., ii, 544 (1864)—Phyllopalpus.
Sauss., Miss. scient. Mex., Rech. zool., vi, 368 (1874).
U. S. east of the Mississippi, except northern portions.

ENEOPTERINAE.

APITHES Uhler.

agitator Uhl., Proc. ent. soc. Philad., ii, 546 (1874)—Hapithus.
Sauss., Miss. scient. Mex., Rech. zool., vi, 490 (1874).
quadratus Scudd., Proc. Bost. soc. nat. hist., xii, 140 (1868)—Hapithus.
tenuicornis Walk., Cat. Derm. salt. Brit. mus., i, 75 (1869)—Lebussa.
Southern U. S. east of Great Plains.

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APITHES (Continued).

brevipennis Sauss., Biol. centr. amer., Orth., 268 (1897).
Georgia, Louisiana.

macneilli Blatchl., Can. ent., xxiv, 27 (1892).
Indiana.

OROCHARIS Uhler.

gryllodes Pall., Spic. zool., i, 16, pl. 1, fig. 10 (1767-1774)—Gryllus.
Gmel., Linn. syst. nat., i, pt. 4, 2062 (1788)—Gryllus (Acheta).
Haan, Bijdr. kenn. Orth., 226, 232 (1842)—Gryllus (Eneoptera).
Walk., Cat. Derm. salt. Brit. mus., i, 66 (1869)—Eneoptera.
Sauss., Miss. scient. Mex., Rech. zool., vi, 495, 519 (1874).
?*unicolor* Linn., Syst. nat., 10 ed., i, 427 (1758)—Gryllus (Bulla).
?*similis* Walk., Cat. Derm. salt. Brit. mus., i, 78 (1869)—Platydactylus.
Gulf states.

saltator Uhl., Proc. ent. soc. Philad., ii, 545 (1864).
U. S. east of Great Plains except northernmost and southernmost portions.

uhleri McNeill, Psyche, vi, 9 (1891).
Illinois.

METRYPA Brunner.

lurida Walk., Cat. Derm. salt. Brit. mus., i, 53 (1869)—Tafalisca.
Sauss., Miss. scient. Mex., Rech. zool., vi, 513-514 (1874).
Southern Florida.

NOTE.—During the printing of this Catalogue a paper by Hancock has appeared (Ent. news, x, 275-282, –1899) in which *Nomotettix sinuifrons* is described from Minnesota, *Tettix brunneri* Bol. is placed as a synonym of *Tettix granulatus* Kirby sp., while the eastern species commonly, but in his view erroneously, regarded as Kirby's granulatus is renamed *Tettix morsei*.

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APPENDIX.

Description of Orthoptera belonging to Genera new to the United States.

BLATTIDAE.

Loboptera americana sp. nov.

Pl. II. Fig. 4.

Form oval, the head completely concealed from above by the pronotum, fusco-castaneous, ferruginous above. Pronotum uniform rather light castaneous, subpyramidal, narrowing rapidly and almost regularly from behind forward, but with a slight constriction mesially, in front not more than one-half as broad as behind, smooth, glistening. Tegmina rounded subtriangular, a little longer than broad, lateral, and separated at base by fully their own width, luteo-castaneous. Abdomen castaneous at base, but beyond fuscous, smooth and glistening.

Length of body, 9 mm.; breadth, 5 mm.; length of pronotum, 3 mm.; tegmina, 1.75 mm.

1 ♀. Ehrenberg, Colorado River, Arizona, E. Palmer.

The tegmina are much larger than in *L. annulicornis* Sauss.-Zehntn., the only other North American species known.

Pelmatosilpha rotundata sp. nov.

Plate II. Fig. 5.

Body rotundate, hardly depressed, oval, uniform dark castaneous. Head concealed beneath pronotum, the eyes as distant as the antennal scrobes. Pronotum smooth, glistening, without depressions, well rounded, without angulations, feebly convex posteriorly. Tegmina subcorneous, almost as long as the abdomen and enclosing it, exposing only the supraanal plate, very broad and at apex broadly and symmetrically rounded; wings of equal length. Legs black, the hind tibiae triseriately spined above, the metatarsus of hind legs as long as the three succeeding joints together. Cerci broad lanceolate, hardly surpassing the supraanal plate, the latter rounded triangular, apically

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subtruncate and a little emarginate; subgenital plate deeply fissate in the female, with a rather shallow V-shaped emargination in the male; styles slender, pointed, shorter than the plate.

Length of body, ♂, 30.5 mm., ♀, 31.5 mm.; breadth, ♂, 16 mm., ♀, 16.5 mm.; length of tegmina, ♂ ♀, 21 mm.

1 ♂, 1 ♀. Texas, Panama.

This species is closely allied to *P. alaris* Sauss., of Brazil, with which I had an opportunity of comparing it in 1865, but it is larger and uniformly colored, with much shorter cerci.

Hormetica advena sp. nov.

Testaceous and black. Head completely concealed from above, the face light testaceous, with a broad median castaneous band failing to reach the labrum, and above marked by three vertical testaceous lines; first two joints of antennae light castaneous, the remainder black. Body oval, the pronotum large, its lateral margin strongly reflexed and within the fold thus formed strongly and coarsely pitted; light castaneous, the disc with a large, roughly embossed, rudely horse-shoe shaped elevation heavily and broadly marked with black and within coarsely punctate and dotted with fuscous. Tegmina subtriangular, reaching rather less than half way to tip of abdomen, the costal margin slightly reflexed, black centrally, bordered very broadly along the whole costal margin and narrowly along the apical margin with light castaneous. Mesonotum and metanotum castaneous, each twice narrowly banded transversely with fuscous. Abdomen with strongly rounded contour, black, laterally and apically margined conspicuously with testaceous. Legs testaceous, the spines black.

Length of body, 34 mm.; pronotum, 11.5 mm.; breadth of same, 17 mm.; length of tegmina, 10 mm.; breadth of same, 9 mm.

1 ♀. Belmont, Mass., December, G. H. Parker (Mus. Comp. Zool.). Unquestionably introduced from tropical America, but an undescribed species, most nearly related to *H. verrucosa* Brunn.

PHASMIDAE.

Sermyle strigata sp. nov.

Plate I. Fig. 3.

Whole body dull ashy grey. Head furnished above with four longitudinal rows of small tubercles. Whole thorax mesially carinate and also furnished above on either side with a pair of carinae, all the carinae equidistant and furnished as well as the intermediate spaces

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with small sparsely scattered tubercles. Abdomen and intermediary segment similarly marked but with an additional pair of subdorsal carinae and with fewer and much more obscure granulations, mostly confined to the carinae. Hind femora reaching to the end of the fifth abdominal segment. Abdomen nowhere expanded.

Length of body, 72 mm.; antennae, 30 mm; mesothorax, 18.5 mm.; metathorax, 10.5 mm.; abdomen, 35.5 mm.; hind femora, 22.5 mm.; width of middle of mesothorax, 3 mm.

3 ♀. Texas, Boll, Lincecum.

This species appears to fall near *S. azteca* Sauss., but differs by the carinate thorax, with its dull coloring.

Bacunculus tenuescens sp. nov.

Plate I. Figs. 1, 2.

Body exceedingly slender, flavous beneath, brown (♂) or green (♀) above, becoming infuscated on the lower portion of the sides forming a postocular stripe. Head greatly elongated, much longer than the pronotum; antennae much shorter than the body. Entire body quite smooth with a very delicate mesial carination. Seventh and ninth abdominal segments of male subequal in length, slightly longer than the eighth and about half as long as the sixth, the seventh segment scarcely inflated, bearing beneath a deflexed subspatulate convex plate, reaching the tip of the eighth segment and no broader than it; ninth segment cylindrical, equal, truncate, bearing a pair of decurved and incurved, cylindrical but slightly clavate, blunt tipped cerci, about as long as the segment.

Length of body, ♂, 64.5 mm., ♀, 53+ mm.; antennae, ♂, 41 mm., ♀, 35 mm.; head, ♂, 3.25 mm., ♀, 3.5 mm.; thorax, ♂, 31.5 mm., ♀, 25 mm.; mesothorax, ♂, 16 mm., ♀, 13 mm.; abdomen, ♂, 30 mm., ♀, 25+ mm.; fore femora, ♂, 18 mm., ♀, 15.5 mm.; middle femora, ♂, 14.5 mm., ♀, 13.5 mm.; hind femora, ♂, 20 mm., ♀, 16 mm.; width of mesothorax in middle, ♂♀, 1 mm.

1♂, 1♀. Cedar Keys, Fla., June 6; Capron, Fla.

The tip of the abdomen of the female is lost.

ACRIDIIDAE.

Plectrotettix patriae sp. nov.

Plate III. Fig. 2.

This species differs from *P. viatorius* (Sauss.), to which it is closely allied, by its smaller size and by the markings of the tegmina, which

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do not show a distinct series of pallid stripes obliquely crossing or almost crossing the wing, but only feeble traces of these just below the main vein. The longitudinal carinae of the occiput are also more pronounced and the hind tibiae are uniformly luteous, the hind margin of the prothorax is more obtusely angled and the disk of the metazona more finely and more obscurely punctate.

Length of body, 29.5 mm.; tegmina, 27.5 mm.; hind femora, 21.5 mm.

1 ♀. California (the label is marked with a query).

LOCUSTIDAE.

Hormilia elegans sp. nov.

Plate III. Fig. 1.

Green, the lateral carinae and posterior margin of pronotum pallid, as also the oblique branches of the principal veins of the tegmina, giving it a very elegant ornamentation. Pronotum with strongly arcuate and pronounced lateral carinae, making the disk twice as narrow in the middle as behind, the hind margin strongly convex and subangulate, the lateral lobes fully as deep as long, strongly convex below. Tegmina surpassing the hind femora, with feebly sinuate hind margin, scarcely ampliate apically, the apex roundly and obliquely subtruncate, the radial branch with three or four veinlets, itself united near base with the upper ulnar branch as if a continuation of the same; wings surpassing a little the tegmina. Fore femora unarmed beneath. Ovipositor brief and broad, upcurved.

Length of body, 17 mm.; tegmina, 28 mm.; wings, 30 mm.; hind femora, 19 mm.

3 ♀. Las Cruces, New Mexico, October, T. D. A. Cockerell; Mesilla, New Mexico, June 30, A. P. Morse.

In the markings of the tegmina and the character of their neuration this insect differs from all the other species known.

Engoniaspis testacea sp. nov.

Nearly uniform dull testaceous, the lateral lobes of pronotum marked posteriorly with fuscous, the hind legs ferruginous, which also tinges the lateral lobes. Head well rounded and full, the fastigium moderate, rounded. Pronotum with gently arcuate disk, angularly separated from the nearly vertical lateral lobes, forming lateral carinae which are gently sinuate, the disk narrowest in the middle of the

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anterior half; no median carina, but a slight and fine median sulcus fading posteriorly; front margin feebly convex, hind margin truncate; lateral lobes deep anteriorly, rotundato angulate below, the oblique hind margin with a considerable but broad sinus; prosternal spines short, blunt. Tegmina mere pads, wholly concealed from above by the pronotum. Hind femora very short, but slender, hardly if at all surpassing the abdomen; hind tibiae armed beneath at tip with a pair of larger spines having a smaller pair between them. Abdomen very plump.

Length of body, 27(?)mm.; pronotum, 9.25 mm.; hind femora, 18 mm.

The only specimen seen (in the U. S. National museum) has been damaged and has lost the end of the abdomen, so that the sex is indeterminable. As it comes from the Riley collection without locality, it was presumably collected by him in Missouri, from which the specimens in Brunner's collection came on which (undescribed) he founded the genus. This is therefore probably his species and if so the type of the genus. According to Brunner's tables, the ovipositor is straight.

Eremopedes unicolor sp. nov.

Plate II. Fig. 1.

Nearly uniform dull brownish testaceous, the hind femora feebly infuscated apically. Head full, the face somewhat ferruginous and the genae with fuscous blotches, the fastigium rather prominent, rounded; antennae very slender, about half as long again as the body, testaceous. Pronotum well rounded, equally arched in front and behind, without lateral or median carinae, the front margin feebly convex, the hind border truncate, but laterally rounded; lateral lobes obliquely deflexed, well rounded beneath, the oblique posterior margin with a distinct though slight sinus. Tegmina aborted. Legs rather long and slender, the fore tibiae with three spines above on outer margin. Ovipositor more than two-thirds as long as the hind femora, distinctly arcuate, moderately slender, faintly tapering, apically acuminate, castaneous the apical margins darker.

Length of body, 25 mm.; pronotum, 8 mm.; fore femora, 7 mm.; hind femora, 21 mm.; ovipositor, 16.5 mm.

1 ♀. Arizona, U. S. National Museum.

This is the species on which the genus was established and hence is the type, although another species has previously been described under

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this generic name—*E. scudderi* Cock. It differs from that species in its larger size, relatively shorter hind legs and much shorter ovipositor.

I possess a third species of Eremopedes from Pecos River, Texas, but unfortunately none of my specimens are well preserved.

Idionotus brunneus sp. nov.

Plate II. Fig. 2.

Uniform dark wood-brown without markings. Head well rounded and smooth with rather prominent rounded fastigium, the genae feebly, sparsely and minutely punctate. Pronotum rather small, the disk nearly plane and smooth, with faint, minute and very sparse punctuation; median carina present only on posterior third and obscure; lateral carinae very distinct and sharply angulate, percurrent, sinuate, rapidly convergent in middle of anterior half and then again divergent; front and hind margins truncate; lateral lobes obliquely vertical, not quite so deep as long, the lower margin subrectangulate posteriorly, the hind margin with a slight sinus. Tegmina subcircular pads of no great size. Legs long and slender, the attenuate portion of the hind femora nearly as long as the thickened portion, and extending far beyond abdomen; fore tibiae with three spines above on inner margin, the outer margin unarmed. Ovipositor fusco-ferruginous, slender, nearly straight, subequal, the tip acuminate, fully two-thirds as long as hind femora.

Length of body, 19 mm.; pronotum, 6 mm.; fore femora, 5.5 mm.; hind femora, 20 mm.; ovipositor, 14 mm.

1 ♀. Folsom, Sacramento Co., Cala., July 7, U. S. National Museum.

This may be regarded as the type of the genus.

Ateloplus notatus sp. nov.

Plate II. Fig. 3.

Luteo-testaceous, marked with fuscous. Head luteo-testaceous, the face luteous, somewhat appressed, the antennae luteous, faintly and narrowly interrupted with fuscous, very slender, more than twice as long as the body. Pronotum ample, transversely arched, the lateral lobes flaring and forming a continuous curve with the dorsum, below rounded obtusangulate, the front margin faintly arcuate, the hind margin truncate or feebly and very broadly emarginate, the prozona marked off by a rather sharply depressed obtusangulate V-shaped

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sulcus, the whole luteo-testaceous clouded with fuscous blotches and a median fuscous stripe. Tegmina aborted. Legs luteo-testaceous, all the femora but especially the hind pair marked apically with fuscous, the outer face of the hind femora also with a median blackish fuscous stripe; fore tibiae unarmed above except for an apical spine on the outer side; hind tibiae luteo-castaneous marked basally with fuscous. Abdomen luteo-testaceous minutely dotted with fuscous at the apex of the segments and with a broken median fuscous stripe. Ovipositor gently arcuate, about two-thirds as long as the hind femora, tapering only at apex and finely pointed, luteo-castaneous, the margins feebly infuscated apically.

Length of body, 21 mm.; pronotum, 7 mm.; fore femora, 6.5 mm.; hind femora, 18.5 mm.; ovipositor, 12.5 mm.

1 ♀. San Diego, Cala., C. R. Orcutt, U. S. National Museum.

This is the type of the genus.

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CORRECTIONS.

Page 4, line 28, for bilinata, read bilineata.
6, " 15, for Sphongophora, read Spongophora.
38, last line but one, for Rep., read Ann rep.
43, line 14, for thallassinus, read thalassinus.
52, last line but one, add:—Pezotettix.
53, last line, add: New Mexico.
63, after last line but 5, read: Washington and Oregon to Wyoming.
65, after 3d line, read: Arkansas and Nebraska to Illinois and Kentucky.

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NOTES UPON THE ETHNOGRAPHY OF SOUTHERN MEXICO.

EXPEDITION OF 1898.
MARTIN A RYERSON EXPEDITION OF 1899.
MRS. FRANK G. LOGAN EXPEDITION OF 1900.

BY FREDERICK STARR.

FEW PERSONS realize the Indian population of Mexico. Most of us think of our sister republic as composed of a *mestizo* or mixed-blood population. Government statistics, however, show about $\frac{5}{12}$ of the total population to be pure Indian. The Indians are not, however, spread uniformly over the country. There are some tribes indeed in the north—Yaquis, Mayos, Tarahumares, Coras, Huicholas, —but in general Northern Mexico is occupied by *mestizos*. In Southern Mexico, on the contrary, from the City of Mexico southward the Indian overwhelmingly predominates. There many tribes, each with its own language and peculiarities are crowded together in masses. Among these tribes many old ideas and customs survive, much of ancient dress and art. An impressive fact is the curious way in which some phases of the old life may be lost while others are retained. Thus, the Mixes are among the most conservative mountain tribes: at all the villages the native tongue is spoken and in some the women hardly understand any other; yet the dress is European. On the other hand in some Zapotec villages the women frequently wear native dress, but speak the old language rarely if at all.

The writer's main purpose in his last three journeys was to ascertain and define the physical types of the different tribes. To accomplish this three kinds of work were done: (a) measurements were taken upon one hundred men and twenty-five women in each tribe, and a description written of each subject; (b) photographs were made of selected subjects, a front and profile view being taken of each; (c) plaster busts were modeled from subjects who seemed to be tpyical, five subjects generally being selected in each tribe. The results of the measurements will probably be published after the work is finished

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as a *Bulletin of the Department of Anthropology of the University of Chicago*. While doing this work in physical anthropology many photographs and data of ethnographic interest were secured. A selection of the photographs has been published under the title *Indians of Southern Mexico*. The volume is an Ethnographic Album of one hundred and forty-one plates, with thirty-two pages of descriptive text. The ethnographic notes are *here* presented. They make no claim to completeness, but it has seemed worth while to publish them; other travelers may pass them by and many customs and practices will soon be gone.

Some things are common to all the Indian tribes and even mark the *mestizo* as well. Thus the use of the *metate* for grinding maize is universal. This instrument is a flat slab of stone with three supporting legs cut from a single block: one of the supports is shorter than the others so that the flat upper surface slopes somewhat. A second stone, long, cylindrical but somewhat tapering toward the ends is used as a rubber. The maize is ground between the two to a meal or to a dough. The roller or rubber is called *metlapilli*, child of the *metate*. These names, derived from the Aztec, are widely used. The *tortilla*, Aztec *tlaxcal* (bread) is as widely extended in Mexico as the metate to which it owes its origin. It is a griddle cake of corn meal. The grains of maize are soaked in lye-water and then rubbed to a dough with the *metlapilli*. This dough is slapped from hand to hand, all the time being turned around and around, until it is shaped into a thin, flat, round cake, which is baked upon an earthen griddle. There are several kinds of *tortillas;* some are thin, while others are fat; some have a dark green or blueish color and contain an admixture of *frijoles* (beans). *Tamales* are a sort of dumpling made of corn meal wrapped in corn husks and boiled; they may be sweetened, or hot with chili, or lined with meat or the flesh of fowls. *Atole* is a thickish, sweet, gruel of corn which is drunk from *jicaras* (cups). *Champurado* is a mixture of *atole* with chocolate. *Mole* is a stew of meat, with nuts, raisins, vegetables, etc., in a chili sauce; two kinds are favorites, *totomol* (Span. *mole de guajalote*, turkey mole) and *tlilmol* (Span. *mole prieto*, black mole).

During the expeditions of 1898, 1899, 1900, the author visited sixteen or seventeen tribes. The location of thirteen of these are shown in the sketch map accompanying. The numbers on the map show the areas of:

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I. Otomis. II. Tarascans. III. Aztecs. IV. Tlaxcalans. V. Mixtecs. VI. Triquis. VII. Zapotecs. VIII. Mixes. IX. Tehuantepecanos (Zapotecs). X. Juaves. XI. Chontals. XII. Cuicatecs. XIII. Chinantecs.

The additional tribes visited in 1900 are located as follows: Mazatecos adjoin XII and XIII. Chochos lie west of XII adjoining V. Tepehuas and Totonacos lie east and north from the eastern part of I.

The Otomis.

The Otomis are considered among the oldest of the peoples of Mexico. The name is variously written Otomí, Othomí, Otomite. They themselves call their language the *hia-hiu*. In 1767 Luis de Neve y Molina wrote an important work upon the language, which did much to clear up the confusion which previous writers had produced concerning it. In 1845 Naxera aroused considerable interest by a dissertation upon the language written in Latin.* It is claimed that the name *hia hua* signifies "the language which endures"; some writers assert that its meaning is "the three-fold language," reference being made to its vowel intonations. Naxera in reply to this says there are not three, but five, such intonations. All writers agree that the language is exceptionally difficult. Naxera says: "it is harsh, dry, ungrateful to the tongue and even more so to the ear." Most

*Reglas de ortografía, diccionario y arte del idioma othomi. Mexico. 1867.
Disertacion sope la lingua, othomí, leida en latin. Mexico. 1845.

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students assert that it is monosyllabic: while some words have two syllables, and a few have three, such are really compound words, each part maintaining its full original meaning or value. Brinton made a vigorous but unsatisfactory argument against this claim. Thirty-four letters are necessary for writing the language, of which thirteen are vowels. A considerable number of onomatopoetic words occur in the language. The parts of speech are badly distinguished, the same word being variously used; relations between the words of a sentence are shown chiefly by position. There are many homonyms and the dissyllabic words, when examined, are usually found to consist of a significant syllable, homophonous in character, and a determinative syllable designating which of the several possible meanings is intended. It is not at all strange that various writers have tried to prove a relationship between this curious language and the Chinese and to see in it a primitive linguistic type.* The language varies so greatly that it has been said that there are as many dialects as there are villages. Pimentel makes it the type of a linguistic family to which also belong the languages of the Mazahuas, the Serranos, the Pames, and the Jonaces or Mecos.

Most writers give the Otomis a bad name. Father Sahagun says that the Aztecs used the word Otomi, in contempt, as a synonym of stupidity. To a stupid dolt, they might say —"You Otomi!" Naxera says: "the people were rude and passed a miserable existence in the mountain forests, and even to-day, dispersed here and there, scattered from their homes by the Spaniards they have not bettered their condition." Garcia y Cubas says: †"Mistrust, indifference and ignorance are revealed in the spirit of their character, which among the Indians of the Sierra is shown to be astute, hypocritical and treacherous, differing in this peculiar respect from the other natives, who without being free from other defects, possess in exchange very good qualities." It is said that they were reduced to settled, village, life only in the fifteenth century, when in subjection to Texcoco. They were not entirely subdued by the Spaniards until the seventeenth century. They occupied an immense area and are now only second to those who speak Aztec in the area they occuy. They are numer-

*Among them Gumesindo Mendoza — *El Otomi es un modelo del origen de las palabras en las lenguas madres, y un ejemplo de como procedieron las razas primitivas para formar su idioma.* Boletin de la Sociedad Mexicana de Geografía y Estadistica. 1872. pp. 41 and 440.

†The Republic of Mexico in 1876. p. 121.

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ous in the States of Mexico, Querétaro and Guanajuato and are found locally in San Luis Potosi, Vera Cruz, Puebla, Hidalgo, and Michoacan. There name is variously spelled — Mazahua, Mazahui, Matzahua, Matlazahua, Mozahui. In 1876 according to Garcia y Cubas there were 550,000 Otomis including Serranos and Jonaces, 50 000 Mazahuas and 25,000 Pames — a total in the Otomi family of 625,000.

To-day the Otomis live in well built villages. Huixquilucan, with its dependent villages, forms a municipality of three thousand persons. Each family has its little patch for raising maize; contiguous patches are separated by lines of maguey (*Inds. So. Mex.*, Plates I, II) from which plants much *pulque* is made. The houses are of adobe bricks and are substantially built. They are roofed with long and narrow shingles, which are held in place by strips of wood weighted with stones, or by long pegs. (*Inds. So. Mex.*, Pl. III.) Maize, when husked, is stored in high square granaries, called *cincalotes*, made of sticks built up in cob-work; the husks are piled up in neat stacks upon a platform supported by posts. (*Inds. So. Mex.*, Pl. III, IV.)

The Otomis spin wool and much *ixtli* fibre, but practically no cotton. Women often spin as they walk. A hank of *ixtli* fibre (derived from the maguey) is thrown over the shoulder from which fibre is paid out to the spindle which is whirled or held in the hands. This consists of a slender stick about a foot in length upon which is fastened a pottery spindle-whorl. These spindle-whorls are not made by Otomis now, but are found in the fields and reapplied to their ancient use. The spindle is widely used by Mexican Indians and is everywhere known by its Aztec name of *malacatl*. At the upper end of the Otomi spindle is a hook used to catch the fibre and hold it while the twisting of the thread takes place. The finished thread is wound upon the spindle above the whorl. This *ixtli* fibre is usually spun uncolored but sometimes it is stained orange with a vegetable dye before being spun. (Fig. 7.)

Otomi women are far more conservative in the matter of dress than the men. The latter rarely wear other garments than the unbleached cotton shirt and drawers worn in most parts of Indian Mexico and Central America. A few old men wear a jacket made of woolen stuff, dark blue in color with a narrow white stripe. This consists of an inverted sack or bag, with slits for the passage of the head and arms; to the latter are attached rather large sleeves. (*Inds. So. Mex.*, Pl. XII, XIII.) This garment reaches well to the

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knees but is usually girded up so as to appear much shorter. These old men also may wear wide leather trousers, slit at the sides, which reach the knees. (*Inds. So. Mex.*, Pl. VI.) The belt worn by men is rather plain. It may be of plain white cotton or may have inwoven color designs. These are usually bands of bright colored cotton or wool. In the specimen figured (Fig. 4) the belt is of white cotton with decorative bands in red, with purple and green borders; through the middle of each band runs a serpentine line of red wool, raised well above the rest of the texture, which leaves a double line of semi-lunar white spots along its sides. The weaving is close and fine; the length is some ten feet, while the breadth is but five and a half inches. Such belts are wound several times about the body.

Otomi women *usually* wear the native dress — *camisa* or *huipil* and *enagua* or *cueitl.* The *camisa* or shirt covering the upper body is a simple inverted bag of purchased cotton. It has head and arm slits but is sleeveless. At the sides of the head slit and along the lower edge are decorations, embroidered designs in bright wools — red, purple, green, and orange. The lower border bears a simple, running design in red; just above this in the middle is a conventionalized floral pattern, while small designs are worked at the corners. The design at the neck is more complicated and is repetitive, presenting two birds facing a monument, which stands between them; these elements are separated by a stiffly spreading floral tree. (Fig. 1.) We have described an individual example. These *camisas* vary greatly in decoration and are sometimes much larger than the one illustrated. The idea is, however, in all the same. The *enagua* consists of two strips of cloth, usually unlike, stitched together along the side. The two united are broad enough to reach from a little above the waist to below the knees or almost to the ankle. Of these two strips one is usually unbleached cotton, purchased in the city; the other is native stuff, woven in narrow stripes. The general effect of these stripes is blue, brown, or reddish brown. The *enagua* is made up so that the stripes run horizontally across the figure of the wearer. (*Inds. So. Mex.*, Pl. V.) The *enagua* of the Otomis is comparatively scant, but is more than long enough to go around the body. Women's belts vary little in size and pattern, but much in color. The foundation is a white cotton, striped with color bands: the central band is broad and bears highly conventional designs. In the portion represented in Fig. 3 there are, from below upward, a complicated rosette and dia-

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mond pattern, a rectangular combination, an animal with tail raised, a woman in European dress with a large hat, a hexagonal design made by six triangles with apices meeting, the animal with upraised tail, a complicated hexagon-sigma etc. pattern, and a creature as much resembling an ostrich as a giraffe. This belt measures ten feet in length by about six inches in breadth.

Formerly men wore the hair in a braid down the back. Few retain this ancient method. Antonio Calistro, (*Inds. So. Mex.*, Pl. XIII) at eighty-four the oldest man in his village, was the only one at Huixquilucan who did so. This old man walked in from his farm four miles to be measured and photographed, while most of his townsmen objected to both operations; it appeared that he had somewhere heard that the work was being done for the Pope, who wished to see how his Otomi children look.

Women, frequently, and men, sometimes, carry an *ayate* or carrying cloth made of *ixtli* fibre. It is made by placing two strips of the material side by side and stitching the line of junction with colored wools. Decorative designs are worked upon them in colored wools; these are usually simple—like the triangles placed tip to tip in Fig. 5; sometimes a stripe of geometrical patterns runs across the whole *ayate;* occasionally animal and bird designs occur. *Ayates* range in size from one-and-a-half by two-and-a-half feet to about four by five feet. The material is wonderfully strong and durable: while rather coarse and harsh, occasional specimens are produced which are almost as soft and flexible as cotton. The *ayate* is used in carrying all but the most awkward burdens: the parcel is laid upon it and two opposite corners of the cloth are brought over it and tied: the package is then lifted to the back and the other two corners are brought around over the shoulders and knotted in front. (*Inds. So. Mex.*, Pl. VIII, X, for illustrations of babies carried in *ayates*). *Ixtli* is sometimes, though not often, made into garments. The man represented in Plate XI, (*Inds. So. Mex.*) wears a tattered upper covering of *ixtli.* In Fig. 6 is represented a curious cover or spread for a box or table. It is made of *ixtli* fibre loosely woven into an open mesh fabric. Upon this unsubstantial foundation are needle-worked geometrical, floral, bird and animal designs in purple, red, green and orange wools. They are in open patterns of cross-stitching. An examination of the figure will bring out many curious details. The double-head eagle, near the centre of the piece, is of especial interest.

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The Tarascans.

The Tarascans live chiefly in the State of Michoacan, of which they form one-fifth of the population; a few live in the adjoining states of Guerrero, Guanajuoto and Jalisco. The former area occupied by them — as shown by geographical names — was considerably larger. They now number one quarter of a million persons. In the cities of Patzcuaro, Uruapan, Zamora, Chilchota, are many *mestizos*: but there are many large, purely Indian, towns like Cheran, Capacuaro, etc. In these Indian towns Tarascan is the commonly spoken language. Orozco y Berra considered this language independent, unrelated; Pimentel describes it as polysyllabic, polysynthetic and sub-inflected. It requires an alphabet of twenty-seven characters. Accent or intonation plays a considerable part in differentiating polysyllabic homophones. The language has been considerably studied. The old Tarascans had a characteristic culture; an organized government; considerable differentiation of trades, each of which had a leader or director who bore a special title. Thus, the chief feather-worker was called the *usguaricuri*. The worship was a developed polytheism; human victims were sacrificed; there were many priests with varying functions and differing degrees of importance. The ancient Tarascan capital was Tzintzuntzan on Lake Patzcuaro. The people of today are agriculturists; those of Janicho, on an island in Lake Patzcuaro, are fishermen. In disposition the Tarascans are reserved and suspicious.

Tarascan houses are chiefly of two kinds: of sundried *adobe* bricks and of logs. The latter are well constructed, the logs being neatly fitted. These usually have a four-pitched roof, the front and rear slopes being wider than the end slopes and meeting for a certain distance along a ridge line. Such log houses with four-pitched roof are shingled with long and narrow boards. The *adobe* houses usually have the roof with two pitches from a ridge pole and are covered with tiles. (*Inds. So. Mex.*, Pl. XVIII, XX.) In the towns on Lake Patzcuaro the *adobe* house with tiled roof is the common type; along the road from Patzcuaro to Uruapan, and at Cheran, Parracho, etc., the log house with shingled roof prevails. These log houses on the roadside are all adapted to business; in the side toward the road there is a small, rectangular opening which can be closed with a wooden shutter. When these are opened little stocks of spirits, fruits, cigar-

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ettes, etc., are displayed to the traveler. In some Tarascan towns—e. g. Santa Fe de la Laguna on Lake Patzcuaro—the houses are embowered in fruit trees and the houses and grounds are enclosed by a wall of adobe bricks some eight feet or so in height. Entrance to the enclosure is given by a gateway, which is usually protected by a little two-pitched tiled roof. The rear plank of the gate—i. e. that which is hinged to the supporting post, and the upper bar are often in one piece, (connected trunk and branch of a tree). There appear to be no temascals or sweat-bath-houses. In Lake towns where pottery is made e. g. Santa Fe de la Laguna, there are pottery kilns at many houses. They are built of stones and mud and are circular: they measure four feet or more across and nearly three feet in height. The unbaked vessels are built up in the kiln quite solidly almost to the top and are then covered with a layer of broken pots. The fire is put through a little opening, into an apartment below the vessels and is increased little by little until the whole mass is intensely heated; this complete heating is kept up for some time and then allowed to die down. A sheltering roof is built over these kilns. The pottery of Santa Fe is of three wares—brown with black cloudings, brilliant black glaze, green metallic glaze. The clay used is local and is pressed in molds. The green glaze is produced by applying a wash of white earth, brought from a distance, and heating. The pieces are usually of moderate size or small; cups, vases and pitchers are the common forms manufactured. There are at least twenty-one other towns on Lake Patzcuaro. Among them Tzintzuntzan is well known as being the ancient capital and possessing in its village church an original Titian —a Descent from the Cross. There are many *mestizos* in its population. Quiroga, famous in local ecclesiastical history, having been formerly a diocesan capital, manufactures many *enaguas* of black wool. Janicho (*Inds. So. Mex.*, Pl. XVI) is practically confined to fishing, though the little rock island on which it is situated is cultivated over its whole available surface; nets and fish spread out on mats to dry are the things most in evidence to the visitor. (*Inds. So. Mex.*, Pl. XIX, XX.) Men make and mend the nets. (*Inds. So. Mex.*, Pl. XXII.)

The canoes used on the lake are dugouts; they range from hunting canoes for one man to travel canoes that will carry eight or more persons. At the stern they are cut almost square; at the bow trimmed to a slope from the water upward; they are wide and flat-bottomed

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below; the walls are rather thin, thicker below than above, and almost vertical inside; there are buttressing pieces left at two or three places on the bottom which serve as strengthers and for seats; the bow not only rises, but also narrows, and a buttress block left in it serves as a foot-rest for the steersman. Paddles, cut from a single piece of wood, with a beautifully round blade some eight inches in diameter, and a handle three feet or so long, serve for propulsion; the paddle may be used on one side of the canoe only, or alternately on both; in the former case after a direct stroke for propulsion, an oblique stroke is given to maintain the course; women paddle as well as men, and when several paddlers move together excellent stroke is observed. The steersman, sitting high-perched in the bow, uses a paddle similar to the others, but with a lengthened handle, which passes through a rest or loop made by lashing a crooked stick to the upper edge of the canoe on one side. Gum from pine trees is used in calking cracks or splits in these canoes. (*Inds. So. Mex.*, Pl. XVIII, XXI.) In hunting ducks a spear-throwing stick is used, which is called *tsu-pa-kwu*. (*Inds. So. Mex.*, Pl. XXI; also Fig. 12.) This is simple, about two feet long, with two holes for the fingers, a groove in which the spear shaft lies and a peg against which the but rests; there is also a hook below the end for dragging floating spears to the canoe. The spears are made of long canes with two or three divergent iron points firmly bound in. (See also Starr: *Internationales Archiv für Ethnographie*: vol. XI, pp. 233, 235.) The nets used in fishing are long seines and great dip nets. It is said that the fish of the lake will not take bait. In making nets a special wooden needle is used.

The localization of Tarascan industries is notable. At Parracho a characteristic *reboso* is made: canoes are hollowed out at Nehuatzen; paddles are made at Pichataro; plaques for lacquering are cut out at a single town in the Sierra and the lacquering itself is done at Uruapan; a handsone black and green pottery is made only at the Once Pueblos.

Woman's dress is notable. The *camisas* are of cotton with the embroidered decoration about the neck in colored wool; the design is little varied. (Fig. 8.) Sometimes the decoration is open work instead of embroidery. (*Inds. So. Mex.*, Pl. XXX.) *Rebosos* are universally worn: those made at Parracho are famous. Of these there are four grades. The cheapest is coarse and of dark blue; the finest are much firmer and finer in texture and black. They range in price

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from fourteen reales to six pesos. All are supplied with a characteristic fringe; this has the usual knotted network of cotton cords for a foundation, upon which is worked by tying a covering of snowy-white and bright blue flossy silk threads; these are so managed as to produce geometrical designs and bird, animal, or human figures. In the upper of the two specimens illustrated (Fig. 9) the pattern is geometrical; in the lower, bird and human figures. The Tarascans were anciently skilled feather-workers. Two *mestizos* at Patzcuaro, who cover printed pictures with humming bird feathers are popularly supposed to continue the old art. To us it seems that these Parracho weavers have better preserved the tradition. These beautiful borders of floss silk look much more like feathers than like thread-work and the mode of attaching the threads to the knotted network is curiously like the Polynesian method of using feathers in their famous ancient robes. The Tarascan *enagua* is a long strip of black woolen cloth sewed together at the ends. (It is really made by sewing several narrow strips vertically side by side.) This is worn wrapped about the body, thrown into many vertical pleats. It is worn over a long strip of unbleached cotton which is also thrown into pleats. When these two articles are properly adjusted they are held in place by belts around the waist. One of these *enaguas* or skirts in our collection consists of a strip *twenty-two* feet long and thirty-eight inches wide; it is made of fourteen strips each thirty-eight inches long, laid side by side and sewed together. This whole twenty-two feet of length must be so pleated as to bring the garment down to fit the body of a little creature far smaller than the women among us. The women's belts are admirably woven. They consist of cotton in which conventionalized designs are woven with colored wools. An examination of the illustrations (Figs. 10, 11) will show that these patterns are geometrical designs and bird, animal and human figures. Thus the first specimen presents a series of birds all alike in size and form; the second presents five female figures separated by transverse lines; the third has again the bird pattern. In Fig. 11 there is a two-headed eagle, a geometrical design, an animal, three geometrical designs, another bird, etc. While the foundation of these belts is white, the figures are in red, green, purple, purple red, or black. The effect is pleasing. These belts are long in proportion to their width and will pass several times around the body. It is customary to wear several of different colors and different widths at one time: the first is wrapped around and around

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the waist, upon itself; a second is wrapped around upon it; others follow. Six or eight may be used at once and form a conspicuous stiff and thick band or ring about the body. The women are fond of silver ornaments—especially earrings—and necklaces; red coral is a favorite material for the latter. (*Inds. So. Mex.*, Pl. XXX.)

The lacquer work for which Uruapan is famous is done by Indian women. The articles are decorated gourds, plaques, and round or elliptical table tops. The colored gourds are made to imitate fruits; a common form is a pear. The color is carefully and slowly rubbed on; the *aje*, which gives the lustre, is then applied and the beautiful brilliancy is developed by rubbing with a tuft of cotton. The plaques and table tops are of wood. They are painted over with a ground color—usually a dull green or black, sometimes yellow or pink; this is somewhat polished and the designs are traced upon it—usually sprays of flowers and leaves; these are then cut out with a little knife or chisel; the colors are laid into these cut designs with the finger tips; line patterns, leaf nervation, etc., are done with a delicate brush; the lustre is then applied and developed. The mass used for lustre is derived from a plant louse—Coccus aje, of the Mexican authors—which lives upon a delicate-leafed leguminous shrub or tree. The insects are gathered in the rainy season and thrown into hot water: a waxy or gummy mass is driven out and skimmed off, washed to rid it of blood and dirt and made up into masses. It resembles a yellow or yellow-brown putty. Uruapan is the town most famous for lacquer work and—so far as I know—the only one where plaques and table-tops are made. Gourds are decorated at Quiroga. Gourds and *jicaras* are lacquered at Ocotlan in Oaxaca, certain places in Guerrero, and perhaps Jalisco. Chiapa, in the State of Chiapas is famous for its lacquered gourds and *jicaras* of all sizes and many varieties and there we have witnessed every stage of the work.

Goitre occurs at Uruapan in one ward—that of San Pedro. (*Inds. So. Mex.*, Pl. XXIV.) Six cases were examined. Of these three were men, three women. One of the men had a wife who was also goitrous, but their child was unaffected. Three out of the six cases were deaf: two were foolish or imbecile. One of the subjects—a woman of sixty years, unmarried—had two brothers, one of whom is a deaf-mute, the other goitrous. In the town of Capacuaro goitre is common. Almost all the persons seen there were affected: the town is purely Indian.

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The Tlaxcalans.

The modern State of Tlaxcala is the smallest of the Republic, having only 1,595 square miles area. Its limits are practically the same as those of the old republic of the same name, which gave assistance to Cortez, against the Aztecs. In 1895 the population was 166,803, giving an average to the square mile of 104.6, the densest in Mexico outside the Federal District. This population is almost purely Indian and the current speech is Aztec. The Tlaxcalans are industrious and thrifty. The state is dotted with little pueblos most of which bear a double name, part Indian, part Spanish—as San Nicolas Panotla, San Juan Totolac, Santa Ana Chiautempa, etc. The man who, now and for a dozen years back, is and has been Governor, Prospero Cahuantzi, is an Indian of pure blood who speaks Aztec as his mother tongue. The population of the state is agricultural but some local industries exist. There are important factories near Apizaco; Santa Ana has a great industry in heavy woollen *serapes* and *mantas*. Pottery is made at three towns: *ollas*, *braseros*, *jarros*, *tinajas*, in black or red ware are made at San Sebastian Atlapa; at Trinidad an unpainted yellow ware is made into *ollas* and *jarros;* a plain ware is made in *ollas*, *jarros* and *labrillos* at San Salvador del Seco. Lime is made at Los Reyes Tlahuiztlan. Canes are carved at San Estevan Tizatlan and sold at the railroad stations of Apizaco and Santa Ana. *Petates* of rushes are braided at Acuitapilco. Pulque is made everywhere. *Costales* or baggings are made at Santa Ysabel Xiloxochtla. The best *fajas* (or belts) are made at San Bernardino Contla and at San Geronimo. Those of Contla are of wool, while those of San Geronimo are of cotton. The latter are striped lengthwise and their cost is fixed by the number of stripes: one of three stripes is worth three reales, one of five stripes five reales, etc.

The houses of Tlaxcalan Indians are well built of abode bricks or stone. Nowhere is the three-part house idea better displayed. The old writers mentioned this peculiarity of Mexican Indian houses and Bandelier lays great stress upon its modern occurrence as a survival. Not only are three-part houses still built; they still bear the old names—*teopantzintli*, *tezcalli*, and *cencalli*. Bandelier translates these terms—*the little place of God*, *the house of the metate*, and *the house of ripe corn*. The *teopanzintli* is the most carefully constructed. It is a single, rectangular room, often with a firm, well-made floor and

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neatly plastered walls; roofs may be flat, one sloped or two-sloped from a central ridge pole; the latter type is the more common; all sloping roofs are thatched with wild grass, *zacate;* sometimes the great pointed leaves, *pencas*, of the maguey are used in roof construction. The *tezcalli* is usually smaller and less well built than the *teopantzintli*. Its walls may be of adobes, or of stones daubed over and cemented with adobe clay; they may however, be made of lighter and flimsier stuff — poles, sticks, and mud. The *cencalli* in Tlaxcala is of a characteristic form and bears the special name of *cuezcomatl*. (*Inds. So. Mex.*, Pl XLIV, XLV, XLVI, XLVII.) It is a vasiform construction of adobe or of clay which rises to a height of from five to ten feet. The construction varies somewhat with locality. The circular base is usually of stones, rather well laid in layers; this may be hollow, with a little doorway in front, and used for storage, but is more frequently solid. Above this base rises the great rounded and hollow body, open above; over this a neat, little, two-pitched roof of thatch serves to shed rain. The *cuezcomatl* is a storehouse or granary for maize on the cob. A ladder is used in storing or removing the grain. Occasionally parts of ancient stone idols, or even whole ones, are built into the wall of the *cuezcomatl*, sometimes certainly with the idea of its guarding or protecting the maize. (*Inds. So. Mex.*, Pl XLVIIIa.) Besides these three constructions, there is in most Tlaxcalan enclosures a *temascal* or sweat-bath. They are neatly constructed of stones laid with mud cement. They are dome-shaped, some three or more feet in height and six feet or more in diameter at the base. The floor is about at the level of the ground outside, but is sometimes scooped out into a shallow basin. An arch entrance permits entrance and exit to bathers creeping on their hands and knees. A little annex built against the outer wall serves as a fire-place; this has an opening which can be plugged up with stones and it communicates with the bathroom itself; a small aperture above permits smoke to escape. When a bath is desired a brisk fire is made in the fire-place, which is then carefully plugged up and sealed on the outside; after an hour's heating the bath house is ready. If an especial amount of vapor is desired water is dashed upon stones inside which have been especially heated; other water is poured in through a funnel or trough constructed in the wall; the heated water gathers in the hollow floor basin and a board placed across from side to side permits the bather to keep himself above this if he desires. While in the bath the bathers can raise their heads into

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the upper, hot, portion of the chamber, or they can throw themselves on their backs and raise their feet or legs up into the hot air. A single bather may occupy the *temascal* alone, but, as the heating of it is a matter of some time and trouble, several are likely to bathe together. We have seen as many as five men and women in a *temascal* at one time. They are entirely naked, but a bunch of corn husks is placed between the legs and so held, with the legs, as to conceal the organs of sex. A second bunch of corn husks is used with which the body is rubbed or hot air is wafted downward from the upper part of the chamber onto the body. The sweat bath not only cleanses; it rests weary limbs, is considered curative of various diseases and helpful to women — increasing their fecundity.

There is little in Tlaxcalan dress to attract attention. The *serapes* and *mantas* made at Santa Ana, on hand or power looms, are much worn. The stuff used for the loose trousers and shirts of the men and the *camisas* of the women is purchased in the market or at *tiendas*, shops. Pretty decorations are worked on the *camisas*, but these will be described later. (See AZTECS.) The carving of canes at San Estevan is really an industry. The woods chiefly used are quince, coffee and *sabino* (a sort of cypress or juniper.) The size, carving and staining vary with the wood. The patterns employed are practically fixed and conventionalized; twined serpents in high relief, alligators, street carriers, scenes from the bull-fight, the national coat of arms, leaf designs,—are among the more common. The ground may be cut into panels, upon which the designs are left in low relief. Stains are used to color the designs. Backgrounds are often cut into pretty plaited or braided surfaces. Burning with a hot iron is one mode of decoration employed. Most of the canes are convenient for use, but some great clubs are cut from the light, white, *sabino*, which, while not heavy, are too clumsy for carrying. Such may measure almost or quite three inches in diameter, and though elaborately carved, sell for small prices. (Fig 19.) All the carving of these canes is done in the homes and by hand; a variety of little chisels, gouges, and knives are employed. (*Inds. So. Mex.*, Pl. XLVII b.)

During our last journey, (the Mrs. Frank G. Logan Expedition of 1900) we spent several days in visiting some of the Indian villages on the slopes of Mt. Malintzi. We were accompanied by Señor Quechol, himself a Tlaxcalan, born in one of these villages, but who has been liberally educated. Until he was thirteen years of age he knew no

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Spanish but constantly spoke Aztec. Partly in the villages, but much more from this gentleman, many data were secured relative to the people of this region. We were especially interested in survivals of ancient life and thought. In all these towns Aztec is the common speech, though most of the men understand Spanish.

These people have many notions about the mountain on which they live. The etymology commonly given for *Malintzi* is *Malina* (corruption of the female name Marina) and *tzin* or *tzi*, the particle indicative of respect. Marina was the native woman whom Cortez encountered near the coast and who accompanied him as an interpreter to Mexico. She was a special favorite with the old Tlaxcalans,—at least she made a profound impression upon them, if we may judge from the curious series of pictures painted at the time of the Conquest and known as the *Lienzo de Tlaxcala*. It is believed by the Indians that the mountain is a beautiful woman who sits in a cave and lets her long hair stream down upon her shoulders; it is she who sends the rain and dew, the hail and snow; she is the protector of all. To secure her favor special men were selected (anciently: also see further for modern conditions) to bear her gifts—*jicaras* (cups of gourds or nuts), ribbons and combs for her hair, water jars, etc., etc.; all these were usually miniatures and not objects for daily use. The Indians still find, in the upper part of the mountain, these gifts that were left in the olden times. Not everyone might bear these offerings but only special men, officials, the *tesitlaske* and the *kiatlaske* (conductors of the hail, and conductors of the rain). It is the common belief that Malintzi still lives in her cave, which consists of vast galleries ramifying through the mountain. Here are ranged in lines hundreds of *ollas*, or water jars, in which she brews her hails and rains and where she stores fruits and grains and seeds. There are, it seems, many different kinds of hail, each consuming its special kind of plant product. The hailstones are animated and hungry: when they are sent forth by Malintzi they devour, each its own seed or fruit or grain, and carry back to the cavern and store in the great *ollas*. (See further on Malintzi, in connection with *the third great superstition*).

Columns of whirling dust, so common in our own arid region, are frequent in many parts of Mexico where they are known by the Spanish name of *remolinos*. At times, on the sandy plains lying to the east of Malinitzi a dozen may be seen at once and even on its slopes they are numerous. In Aztec they are called *ecamalacatl*—from *eca*,

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air and *malacatl*, a spindle. Some believe that they are really spindles set a-whirling by dead souls: others think them the souls of the dead themselves. When they are seen upon the great *haciendas* it is believed that they are the souls of restless former proprietors, which have not yet entered heaven. Shepherd boys delight to stone them as they whirl past but parents warn them not to interfere with the *ecamaac atls* lest they be harmed or even killed. A rainbow is called *cosomalotl*, the etymology of which is not clear; it is suggested that it may come from *cosomalotic*, a term applied to a person who is pale, as also to a plant without chlorophyll. It is believed that trees on which its base rests will dry up and become sere. To point at a rainbow is dangerous: the finger is likely to shrink and die. The Indians do not kill humming birds, believing that to do so will cause a thunderbolt to fall upon the offender.

Señor Quechol says —"the great superstitions are four in number—*Tetlachiwike*, *Tlauwelpochime*, *Kiatlaske* or *Tesitlaske* and *Nahuatl*. The *Tetlachiwike* are witches. They can harm people or render them ill by a touch or glance. Belen on the slope across the Sawapa from Malintzi is famous in all the country round as an abode of them. No more than five years ago in Ixcotla was a family in which the favorite daughter and the daughter-in-law were not on good terms. After a time the daughter began to suffer, first in her leg and then in her arm from a painful and wasting disease. Physicians who were called could do nothing to relieve her. After she had suffered for two or three years her friends consulted a female witch at Belen. She placed a piece of alum in the fire: it assumed a peculiar shape. On examining this the witch claimed that it was the portrait of the daughter-in-law of the family and declared that she was the person who was causing the disease. The matter was dragged into the courts. Two points were propounded for decision:—the possibility of witchcraft and the identification of the alum portrait. The weight of opinion, that of the judge and the witnesses, leaned strongly in favor of witchcraft: one fact only prevented unanimity of opinion. The sufferer asserted that her pains were greatest on Thursdays and Fridays; this argued against witchcraft, as is is well known that witchery cannot be practiced on those days—as on the former Christ was apprehended and on the latter died. Not long afterward the unfortunate girl died. The *Tetlachiwike* are usually careless of personal appearance and go unkempt; they have little to do with their neighbors, except profes-

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sionally. They may operate, in witchery, through representative figures, which they fill with spines or otherwise abuse; these they conceal in fields or lonely places known only to themselves. They may treat disease, each practitioner having his own favorite methods. One treatment much in vogue among them is to puff a bladder full of smoke through a reed and then to inject the smoke into the anus of the patient. They make a considerable use of herbs in infusions, preferring such as have an odor or contain a resin.

A complete study of modern Aztec medicine would be interesting. Father Sahagun gave a good description of that of his time. We have made some study of the folk-medicine of the *mestizo* Mexicans and have compared it with the medicine of the old Aztecs as shown in Sahagun's account. The paper will probably be published as a Bulletin of the Department of Anthropology of the University of Chicago. But of modern Aztec practice we can add little to the remarks already made. *Mestizo* mothers commonly hang little pouches or sacks about children's necks to guard them against disease and harm; these contain holy ashes—from burned palms, etc. Among the Aztecs similar sacks are hung at the baby's neck for a similar purpose, but they contain *chapopotl* or bitumen. These little sacks of *chapopotl* may be worn singly, one at the neck, or in pairs at the wrists. Such bags are called *piall*, guard. *Chapopotl* is bought at the markets or *ferias* from Indian dealers in *remedios*, who are generally called by the Spanish name *arbolarios*. Their remedies are chiefly herbs. These Indian dealers rarely have a settled place for selling, but drift from *feria* to *feria* with their wares. Among the favorite plant remedies sold by them and widely used among the Indians are:

Ixtayatl: a metre or so in height, with long and narrow leaves which give out a bad odor when bruised; this is used for diseases due to the air and for the eyes.

Sotzonitztatl: a small bush, of bad odor, which bears many white flowers, used as a purge.

Tlamacas: a large herb, with downy leaves which become sticky when crushed in the hand; used for diseases due to the air and for ear troubles; is crushed and placed in the ears or snuffed into the nose.

Iollochichil: the leaf is heart-shaped, and although green at first becomes red at the centre with advancing age; it draws and cures wounds; it is applied moistened with saliva.

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Tojonchichil: a small plant with bad odor.

Altamexa: "plant of Santa Maria:" used for ear troubles due to air; the leaves are bruised or ground and put into the ears. Though used by the Indians, this remedy is *more* used by the *mestizos.*

Ijichcatsi: very small and delicate plant, with little leaves; it produces a sort of oil; it acts quickly, like a caustic on the flesh; it is used for curing eruptions and small swellings.

All the above are used as herbs: of the following the seeds or fruits are used:

Atecomatl: something like a calabash, but not edible; the seeds, steeped in water, are serviceable in stomach troubles; pieces of the hard shell are said to be inserted in broken skulls as substitutes for bits of bone.

Cuatecomatl: round seeds, smaller than the preceding; they are steeped to make an infusion which is used for headaches and diseases of children.

Chichilitl: the seed is like a red bean and is generally considered poisonous; its infusion is used in healing and producing witchcraft; the seeds are also roasted and powdered.

The second great superstition of the modern Aztecs is *Tlauwelpochime.* These are female beings who love the blood of young infants. They are much feared and mothers take much pains to guard against them. They prefer to suck the blood from the back of the neck; they also draw it from the sides of the neck or the cheek; they may not, however, take it from the chest or lower body. A child which has been attacked, presents a wee purplish spot at the point sucked. *Mestizo* mothers protect their babes by pictures of saints, but the Indian mother places some bad smelling substance, like onion, in a little pouch hung about the child's neck. These bloodsuckers sally from home through the keyhole or some crack and enter houses in the same way. While on their errand they assume the form of a turkey, but in flying through the air—which they can do only at night—they appear as a moving spot of phosphorescent light. After flitting from place to place and sucking their fill, they return home, vomit the blood into a *casuela,* cook it over the *brasero* and then finally devour it. It is the custom of these beings, when preparing to go outside, to light the fire and set the *casuela* upon the *brasero;* then to scrape off and separate their feet, which they leave behind near the fire, as we might leave shoes.

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Once a woman, hearing a noise in the next room at eleven at night, rose and peeped to see what was happening. She saw her neighbor set out her *brasero* and *casuela* and lay off her feet; watching until her return she saw the creature again put her feet on. The next night the watch was resumed: again the *brasero* and *casuela* were set out and the feet put off. As soon as the bloodsucker was gone the watcher broke into the room and, seizing the feet, placed them in the fire where they were burned. The next day the dead body of a turkey without feet was found lying near the roadway. Rarely the creature wanders forth in the daytime. Once a mother was busy at home making *tortillas*. Suddenly she heard the babe scream and, rushing in, saw nothing but a cord or thread dangling from the ceiling. The babe's face was discolored and gorged with blood. On touching the thread the mother found, for the first time, that it was fast to the child's neck. Seizing a pair of scissors she cut the cord, when the bloodsucker was at once seen, lying dead in the form of a turkey.

The third great superstition is *Kiatlaske* or *Tesitlaske* — conductors or bringers of rain and of hail. These receive their power from Malintzi. The same man may be both a bringer of rain and a bringer of hail. They are the only human beings who have regular access to the caverns of Malintzi, whither they bear the gifts intended for her. In March of each year these men in each village are summoned before the *Principales* where they make public promise that rain shall not fail and that hail shall not fall. If these promises are not well fulfilled the *Kiatlaske* or *Tesitlaske* are held to have broken a contract and the case may even be taken before the courts. At the time they make their contract they are given bread, corn, seeds, and *pulque*. If during the season of rains the clouds on Malinche do not drop, if showers go elsewhere, but not to the pueblo, the rain-bringers put rabbit skins over their faces and raincoats over their shoulders, go out and face the cardinal points, prostrate themselves and repeat their formulas. The villages of San Pedro, San Bartolomé, San Francisco Tetlanoca, and Akxotla are famous for their rain-bringers.——There are two insects which are particularly harmful to the growing crops: they are called *mamayatl* and *ocuilitl*. The rain-bringer gathers a quantity of these, or receives them from the Indians who bring them in, puts them into an *olla* with water and steeps them. He pronounces a formula over the brew and then pours it out over the plants in the field, thus ensuring protection against the pests. The priests of Rome have in some

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villages usurped the functions and trade of the old rain-bringers. In place of the greeting of the cardinal points, the prostrations and formulas of the old rain-bringer, the following ceremonial is seen: the priest, at the beginning of the year, goes about with bottles of holy water which he places at the limits of the field, at the same time repeating formulas of exorcism. This he does to secure rains. It is interesting to observe that the Indian uses the same word *tlatapantisk* for both ceremonials—pagan and christian. As to the other matter, the priests receive the *ollas* full of insects, which they bless and exorcise: they then prepare the brew and use it in the same way as the old rain-bringers and with the same happy result.

The fourth great superstition of our Tlaxcalans is the *nahuatl*. This is a male being, who is a robber and capable of indefinite self-transformation. He steals *jilotes*, or ears of maize, and other vegetable products, domestic animals from the corral or objects from the house. He cannot however steal a dog. In his transformations he is likely to appear as a dog, an ox, or as a mere shade or phantom. He is said to possess great strength and it is dangerous for people to attack him: he can easily fell a man with a blow, but this is never fatal. It is best not to trouble him. Young men who prowl about a-nights, often hear a distant noise, which rapidly approaches: hidden behind a tree or a plant of maguey they see a great black dog rush by. It is a *nahuatl* (nagual) but they do not trouble him. It is evident that the first and third of these "superstitions" are real human beings but the confidence of the Indian is just as stong in the second and fourth as in the others.

There are especial customs connected with birth, marriage and death. As regards birth:— The moon has a great influence over pregnant women: as is its face so is that of the child to be born. Should an eclipse occur the child will be born imperfect—usually with some part of the face wanting. The name *tenqua* is applied to hare-lip and is derived from *tentli* (lip) and *qua* (bitten). The word for eclipse is *metzqualotl*, from *metztli* (moon) and *qua* (bitten). Pregnant women, at times of eclipse, hide themselves to prevent harm to the child. Should some accident happen to a pregnant woman, she may produce a monster. Twins are called *coatl* (snakes) and they are believed to be able to cure *shochal* (see later) and the bites of venomous serpents or other animals. Triplets will be kings. There are special streams in which women bathe to ensure fecundity. Such a stream is the

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Sawapa. In this stream also many Tlaxcalans bathe in the month of May to prevent or to cure smallpox. It is also believed that bathing in the *temascal* aids to fecundity. The welfare of the child is considered to be in some way bound up with the umbilical cord; when this is cut it is carefully buried in the ground, care being taken to place it where it will not be likely to be dug up by a dog or other animal. When a man shows skill or industry in a pursuit there is a common saying—"Oh, he was a worker from the cutting of his umbilical cord." As soon as a child is born the midwife carries it outside the house and—after blowing in its ears—holds it up to the sun that it may be strong. The grandparents at once go out to seek god parents. They carry a candle and flowers; arrived at the house they use a set formula of invitation:

"*O ti hual pano aya no han tzinco y pampa to teotzi que teah mo maquilia nin toha o ti hualaia ti mo tonquishtiquihue que y' o tecuin huan o shotlac ni shochitzintle. Ti mo tlatlatia ma itcoh huetzi ahua huachtzintle ma qui mo ara yatequili huan ma qui zeli achopahualotl de to fe.*"

Translation: "We have come to your door. Since God permits our existence we bring to your house this flower which has just opened: we beg that you shall bathe this flower, just blown, with the pure dew of our holy faith."

The person addressed replies "It is God's will: we must perform it." For, in no event, ought one to refuse such an invitation. The flower is placed in water upon the table and the candle is lighted. This is done as a token of assent and is symbolical. The freshly blown flower typifies the new born child and the lighted candle typifies the illuminating religious doctrine, which they agree to teach.

The christening takes place at night at the home of the parents, soon after birth. If it is delayed the child will be shrewd, smart and wise, but these are not desired qualities. At the christening presents are made by the guests to the mother and the god-parents. As soon as the child can learn he is taught the Christian doctrine. This instruction is usually given by a special class of men known by the Spanish name of *doctrineros* or the Aztec name *teotl tlatol machtique* (god-word-teacher). The parents when first bringing their boys to these men hand them over completely into their authority and beg them to beat the children severely if they do not learn or give any cause of offense. The boys go daily to these *doctrineros* for instruction, before going out to the fields for their work. The instruction may be carried

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on into young manhood. The *doctrinero* may be an intelligent and thoughtful man — or he may be quite the opposite. He is often illiterate and has himself learned the *doctrina* by oral tradition. In the community a boy's standing is judged by his progress with the *doctrinero.* He may be called *icnopil* — docile boy or *ishtekikisk* — never-lowers-his-face, i.e. a disobedient or insubordinate person. The *doctrinero* may retain an influence long after a boy passes from under his instruction. For example, in case a man is persistently immoral or drunken his wife may go to the old teacher and addressing him by the title *tatita* (affectionate and respectful form of *tatli*, father) tells him her complaint. Though he has no official right or authority, his power will not be questioned; he summons the offender and administers a scolding and severe beating.

Marriage is held in respect and esteemed a religious duty. Persons of suitable age who are not married are not respected and are called by a term of reproach — *ahuilisnenk*, equivalent to "vagabond" and literally by etymology "man who plays with the world." In love making pretty phrases are used and presents are exchanged: such presents are usually flowers or trifles bought in the market. The young man never asks directly for the girl but when he has made up his mind his parents go to the *piscal** and the priest and ask them to apply for the girl's hand. They go, accompanied by the *topiles*, in the early morning or at night to make sure of finding the father at home. The girl knows of their coming and usually has her hair neatly dressed, wears her good clothing, and has cleaned up the house well. The party ask the father for the girl and he has the decision entirely in his hands. If he gives his consent, the young man's parents promptly send him a present of considerable value — consisting of bread, flowers, seeds, meat, etc., etc. This present symbolizes abundance and is called *tlasesehuil* — satisfaction or expiation. The gift is divided among the family. On an appointed day, preferably Monday, the church ceremony takes place. The bridal company goes from the church, walking through the village, to the houses of the godparents where all partake of refreshments. This sometimes fills up the whole time from eight in the morning to three or four in the afternoon. All then go to the house of the groom where a great feast is served. When this is carried out with full ceremony two days are occupied with it. The first day *totomol* or *mole de guajalote*

*For this official see further.

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is the characteristic dish; the second day *tlilmol* or *mole prieto*. The latter is a dish which may not be used for daily use but is reserved for weddings and the public dinners of the pueblo. On Wednesday the bride passes through a dreaded ordeal or test — *temaitalistl* = to-see-the-hand i. e. to see the skill. All the neighboring women gather and watch the girl prepare and grind maize, make *tortillas* and prepare *atole*. The inspection is always critical and may be ill-natured.

During Monday and Tuesday of the wedding celebration there is much singing and dancing. The songs *Malintzi* and *Tlaxcaltecatl* are favorites on these occasions. Many of the songs then sung are more or less burlesques and jocular. At the same time much practical joking is indulged, some of it rather severe. On Tuesday night after the festivities, when the company is dispersing the family of the groom sends a great basket full of food — chiefly meats, especially *guajalote*, decorated with flowers and ribbons to the family of the bride. This gift is keenly inspected by all present and the value closely estimated. At Cholula (not in Tlaxcala, but an important Aztec centre in the State of Puebla, and near Tlaxcala) it is customary, in the procession from the church, for the groom to carry a hen, the bride a cock in their arms. These are alive and are carried throughout the visit to the houses of the godparents. Sometimes a turkey is taken instead of the commoner fowls but when so it is driven, not carried, and is decorated with flowers and ribbons. The spectators are wont to take an omen from the actions of this bird; if it goes straight and gives little trouble to the drivers, the married life of the newly married pair will be happy. In this same district a man often goes along with the bridal party, who plays the spoiled child. He is called *monenic* and the crowd teases him, talks baby talk to him and slaps him. In marriage and in ordinary life the woman is considered man's inferior; the *best* word for marriage in the language is *mosetilis*, which in meaning "to make themselves one" suggests the obliteration of the female.

Mention has been made above of the song — the Tlaxcaltecan. At San Francisco Tetlanoca where we first heard it sung and saw the characteristic but simple dance that accompanies it we copied the words of its several stanzas. Señor Quechol is a musician, a teacher of music, and he was good enough to take down the simple air, in the field. Later on at home, of his own fancy, he put the piece into part form for the piano. The air is probably accurate enough and the written form is interesting as presenting a native piece of music put into form by a pure-blood Indian.

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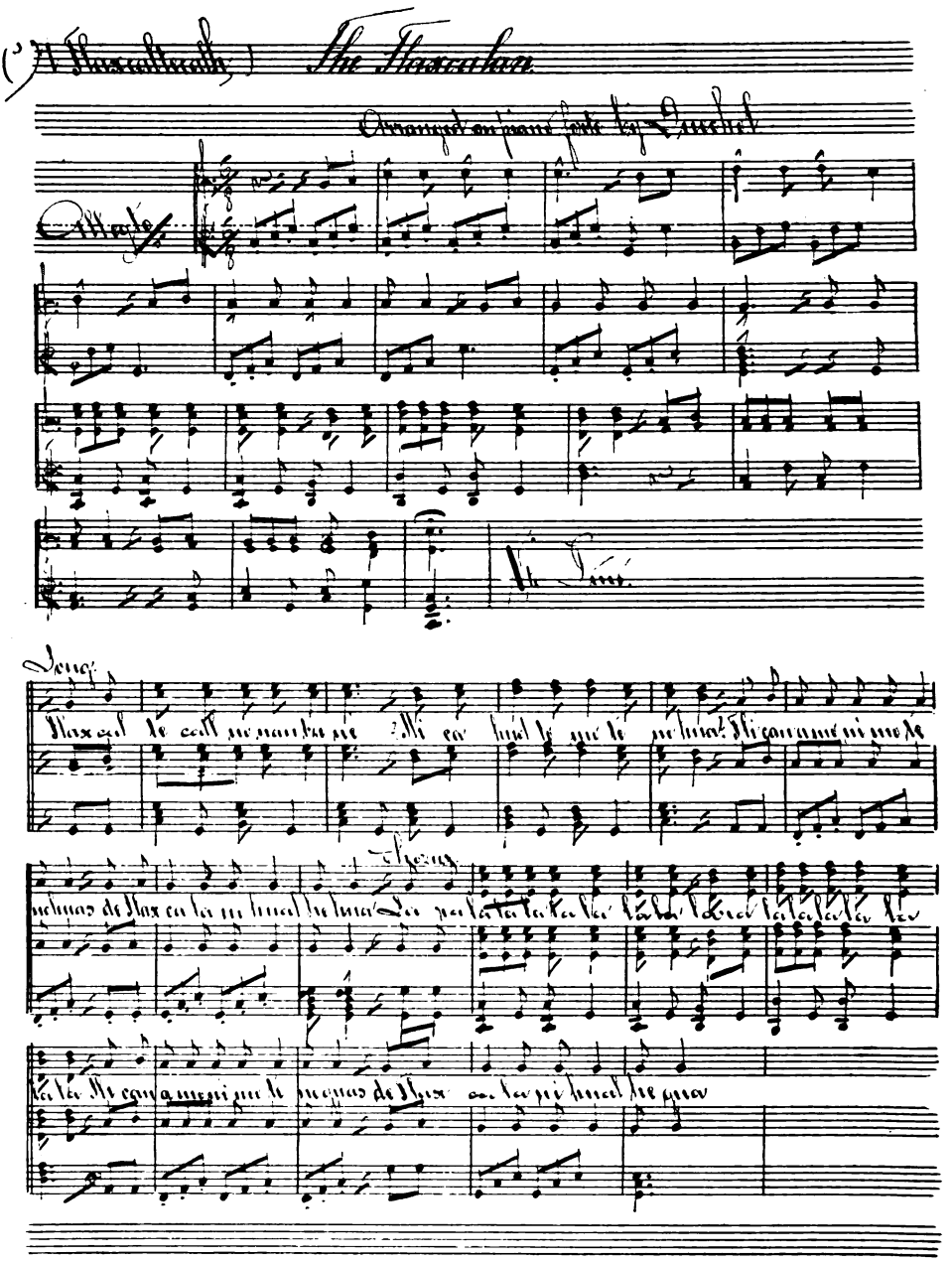
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The verses follow:

Tlaxcaltecatl, no zohapilé
Tlica huel tomo tenehua ?
Tlica n'amo ni mo tenehuas
De Tlaxcala ni hual ehua.

Celic xochitl caxtillan xochitl
Ceceyaca mo macacahua
Ma sanguel no namic—tlasotzi
Semanahuactl, tla' juya ya.

Y' onic itac ce citlali
Tepetzala hual quistihuitz
Y' onic itac no *malintzi*
Tlacatzala hual huetzcatihuitz.

A fourth stanza was copied but is so much mixed with Spanish words as to present little interest.

The customs connected with the dead are interesting. It is believed that the soul after death journeys to the hereafter: good souls follow a straight and narrow path, bad ones a wide one. Both ultimately reach a deep and broad river, which can only be passed by the help of a dog, which takes the souls upon his shoulders and bears them over. The souls are obliged to await the pleasure of the dog and bad souls are refused transportation. It is customary to treat dogs well in this life, in hope that thus one may not meet refusal from this canine carrier. Commonly a coin is placed in the mouth or hand of the dead, to be given to the dog. A dead child is usually finely dressed for burial, often so garbed and ornamented as to represent a favorite saint; music and rockets accompany it to the grave. Adult dead are often dressed in the habit of the Franciscan or Dominican monks. While bells are rung in honor of all adult dead they are rung doubly (in special fashion) for persons of especially devout lives. The Feast of the Dead — so interesting among the *mestizo* population is even more so among the Indians. The festival is called *techalistl*, which means to watch or guard. Preparations are made beforehand. A wide path is cleared through the field to the house, over which the souls may pass. The first to arrive are the child souls. These begin to arrive at 3 P. M. of Oct. 31, and come through a full day. At 3 P. M. Nov. 1 the souls of the adults arrive. At 3 P. M. Nov. 2 all depart. The first day is given up to the children. The markets are filled with toys and *dulces*, things dear to the child heart. These are brought to the home where a little table or a clean and unused *petate*

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(mat) is set out. The little treasures are arranged upon it. The father places sweet copal gum in the censer and incenses the place. The mother carefully arranges and divides the gifts and calls on one and another of the little dead by name —"My Juanito, here is your feast; here are your toys." "My little Maria, come take your things." This is called *tlatetecalistl*, "the distribution or separation of the meal." The door of the house is left open lest the little souls shall find themselves shut out. No one disturbs or touches the gifts. They say that once a little child stood and looked longingly at a dish of *dulces* meant for the little souls: finally he yielded and touched to take. Immediately the fingers reached out to grasp were destroyed. The second day the table or *petate* is larger. Food and drink is set out and care is taken to select food especially loved by those whose souls are to come. Their *ayate* or carrying cloth, staff or favorite garments may be laid near by. Special kinds of bread are baked for these funeral feasts. When finally the dead depart, there is an irruption of living persons — *kwatliltike* —"black headed souls"—who proceed to eat the feast. It is believed that the souls can hear but cannot see and therefore persons are careful of their remarks during the ghostly visits. There was once a drunken husband who greatly abused his wife. Among other cruelties he refused to give her money to buy candles and gifts for her dead parents. Angrily rebuking her for her belief in such follies he shut her up and went onto Malintzi to gather wood. While splitting a tree trunk the log parted and then flying together caught him. He passed into a state of vision, in which he saw a great procession of souls coming up the mountain. They joyfully carried gifts — candles, food, etc. At the end of the long line, sad and dejected, with no gifts in their hands came the souls of the parents of himself and his wife. Alas, he thought, we have given them nothing, but it was too late for repentance, the day of the souls was past. When dogs bark at night it is because they see a passing soul. When food or drink in a room appears to be diminished the family are pleased as they believe souls have been and taken. The souls of women who die in childbirth go to a river where they abide; passers in the night may see them working at clothes washing; they are beckoned to and invited down to the river side — but for them to go is death. A yellow composite flower, much like a *zinnia*, called the flower of the dead, is much used in decorating the tables at these feasts; they are never given to living people for gifts. Sr. Quechol

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says that the name Chihuahua — that of an important city and state in Northern Mexico — is a corruption of *chichihuaquaco* from *chichuaquatchtl* and *co* — meaning "where the trees bear *chichis*" (i. e. teats or breasts). They say that when children die while still sucking they go thither: there the trees have breasts and the little ones clinging to the trunks suck milk. Whether the town in question derives its name as suggested, the existence of a place where the trees suckle the little dead is fully believed.

Mention has already been made of the breads of special kinds used at the feast of the dead souls. Such breads are regularly sold in the Cholula market at that time. Among them are *tlacotonal* (bread cut in figures), *pan tochtl* (rabbit bread, named from its form), and *pan maitl* (hand bread, made in shape of a hand). At the same market many toys are sold made of baked clay and colored with yellow, red, and green pigments derived from plants by ancient and native methods. The color is produced from leaves or fruits, mixed with lime and applied. There is a great trade, at its season, between the men who bring in these plants from the country and the potters who make the toys. The favorite form of these toys is the *totorotl*—a strange word, being an Aztec diminutive noun from a Spanish word—or little bull.

From certain points in the preceding presentation of modern Aztec life it is plain that the people have still much of the ancient fondness for metaphor and poetical language. This tendency in speech is notable and is fully appreciated by the people themselves. Everyone delights in striking and expressive figures, in symbolical language and in expressions which, while terse and simple, are capable of two meanings, one less evident than the other. There are men who are famous for poetical expression or for epigrammatic statement. At Ixcotla is a fine old man now eighty years of age, known and respected through the whole district, whose language abounding in metaphors and flowers of speech is considered a model of elegance. The old man's observations are quoted far and wide. A single example will serve to indicate his thoughtful character. The old man lives alone, his wife having died years since and his younger relatives having moved out into more busy centres. Some one once spoke to him of his life as lonely, solitary. The old man replied: "Alone and solitary? No, we are three here!" "Three?" "Yes; I am never alone! Here am I myself, my good angel and my bad angel."

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They are fond of trite expressions, old saws, proverbs. They have a sense for dry humor. The word for such expressions is *ahuiltlatl*—playful saying. If meat is tough and hard they say it is *chicahuatl*, i. e. "strong." Of tough beef they might laughingly remark *ok huelitis tlatotocas*—this bullock might horn a man; of tough goat meat,—*huelitis kistikisus*—this can surely leap. On festal occasions there is a man whose duty it is to distribute the food and drink to the company. He is called *camatiachca*—from *cama*, mouth and *tiachca*, master, the mouth master. He passes from person to person offering the viands. It is proper to refuse him for a time but he urges, using the expression

Campameya
Pehua,

which can be translated perhaps as *after water once gushes forth it will flow all right.* It seems equivalent to saying "come, come, you must make a beginning." A very common proverb is:

Pani tlapepetlaca
Tlani tlaquauhquauhlaca.

This may be translated—*outwardly fine, intestines crying with hunger.* It is said of persons making display beyond their ability. The form of this proverb should be noted. It is a double rhyme. The first halves and the last halves of the lines rhyme. This special form of rhyming is a favorite in proverbs. It occurs again in the saying:

Ichan ahuacatl
Techan malacatl.

The *ahuacatl* is a common fruit; here it symbolizes neglect or abandonment: the *malacatl* is the spindle and here it symbolizes industry, energy, push. The translation may be—In one's own house neglectful; in the house of another industrious. One neglects his own affairs, but busies himself with those of others.

Techqua pepetzotica
wan techqua tetetzilotica.

Here the double rhyme is imperfect, but the finals rhyme well. The word *pepotzota* indicates to caress, as a cow caresses a calf in licking its head. *Tetetzilotico*, signifies to wrap up or envelope, to wind about as with thread. The proverb may be translated—He caresses us that he may envelope us. It is applicable when a person, to gain his own selfish and harmful ends, uses flattery.

Tla ochauwisoac
Yo ahuiloyuac.

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Chauwistl, is a hot wind that shrivels the plants: it is an "ill wind." *Ahuiloyuac* = "it has become a bad luck," it has no importance. The proverb may be translated *freely*—If he has begun to have ill luck, he has become of no importance. It would suggest that misfortunes never come singly and never cease. Occasionally in proverbs an expression or word felt to be indelicate will be omitted although everyone must clearly have the whole figure in mind by the quite innocent words which are used. A very common expression is

Cuentla den kashitl

where the verb preceding is omitted. It may be literally translated *outside the chamberpot.* It is used when a man does not speak to the point, but rambles from his subject and talks all around it. There must be hundreds of modern Aztec proverbs, but these will serve to illustrate their character, form, and use.

Among the towns in Tlaxcala, and to some extent in all the Indian towns of Mexico, there are certain grades of dignity to which a man may attain and to the lower ones of which all men must attain. These grades are related to church and civil affairs and in their present form must be somewhat modified by Spanish and priestly influence. They are six or seven in number.

Topil. From *teotl* (divine or sacred); *pilli* (child). Boys at eighteen became topils and served as messengers or servants to the church and town.

Tekitlaktok. From *tekitl* (work) and *tlatok* (crier). He accompanies the *fiscal* and stimulates workers. He cries out the public work.

Tlanechikok. Collector.

Mayor Domo and his lieutenant. I do not know the native name of these two officers. They go together and twice a year give a public dinner to the pueblo. These dinners are highly important and have special names. *Centlalli* is the dinner at which these officers announce to the people their duties, work, and tax dues: *tominnechicolistl* is the dinner to which the people bring their dues.

Pixcaltzi or *Fiscal*, The highest dignity in the pueblo. Ordinarily he serves but one year but occasionally two: e.g —Isidro, who denied ever being alone, was honored with the position for two years. This dignitary may call the town together whenever there is business of importance. He is elected by those who

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have "entered upon their career"—i.e. who have been a *topil* or some higher official.

The present Tlaxcalan and Aztec counting of money is somewhat curious, being a mixture of Aztec words and Spanish ideas and the combination, rather clumsy and lame, of two systems of numeration based on 8 and 10. The word *tomi* means a money unit and is used as equivalent to a *real*. A *real* is 12½ centavos of present Mexican money: eight reales make one peso—commonly called by us a Mexican dollar. There are today in use in Mexico pieces of 5, 10, 25 and 50 centavos and 1 peso: also of 2 reales and 4 reales (these equal to 25 and 50 centavos respectively). A medio and cuartilla are half and a quarter real and are made out usually with coppers. The Indians count money as follows:

ce tomi ..... one money (real).
ome tomi ..... two monies (reales).
yei tomi ..... three.
hahui tomi ..... four.
macuil tomi ..... five.
chicause tomi ..... six.
chicome tomi ..... seven.
chicue tomi or one peso ..... eight monies or one peso.
chicnahui tomi ..... nine.
malactli tomi ..... ten.
ce wan yei ..... one (peso) and three (reales).
ce wan nahui ..... one (peso) and four (reales), etc., etc.
ome peso ..... two pesos.
ome wan ce, etc , etc ..... two pesos and one.
yeyi peso ..... three pesos.
yeyi wan ce, etc., etc ..... three pesos and one.

The curious irregularity and misfit of the two systems is seen at nine and ten and a lack of analogy shows itself at seventeen reales, etc. In marking down money transactions the Aztecs, most of whom, of course, cannot read, have worked out an ingenious system which I have not seen described. A horizontal line is drawn. A circle marked upon this signifies a peso; a half circle 50 centavos or 4 reales; a straight mark across it a real or 12½ centavos; a mark reaching, but not crossing it, 6 centavos and a dot below it a cuartilla or 3 centavos. Thus

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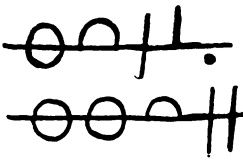

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This already long description of the Tlaxcalans may be closed by presenting a few ideas and notions commonly held. We have already stated that twins can cure *shochal*, i. e. inflammation or pain of the tendons, especially of those of the feet or ankles. It is caused in this way: when a weary person passing along the road stops somewhere to rest, he may pluck a handful of grass and rub or strike his feet with it to relieve their weariness; if another person coming along the road touches the bunch of grass thrown away by the other he not only gains the weariness of which the other was relieved but also *shochal*. When the Otomis visit great sanctuaries in the State of Tlaxcala or Puebla, they frequently relieve their weariness by using grass in this way and near the shrines there are many such tufts of grass in the road. Tlaxcalans going to these sanctuaries watch for these and often will go out of their way to avoid danger of touching them for fear of *shochal*. Stone piles or cairns are not common along roadsides in Tlaxcala but where they do occur they believe the placing of a stone prevents and cures weariness, that it protects against ill luck and that to intentionally refrain from placing one is to invite misfortune. If a coyote shuts its teeth together at the moment a hunter takes his aim the bullet cannot leave the gun. Unusual howling of coyotes presages national disaster; the coyotes are said, by howling, to have foretold the battle of Puebla. Coyotes can render persons incapable of motion.——The eggs of a sort of mosquito are largely gathered at Lake Texcoco and sold at San Pablo and other Tlaxcalan towns. After being dried and washed they are used in various ways for food — chiefly in sandwiches. They are much used and the people claim that there is a compensatory relation between maize and *awactli* in price and supply: when there are many *awactleros* (dealers in these eggs) with their baskets full of *awactli* and the folded serape on top corn is dear.

The Aztecs.

There are people of Aztec blood in the Republic of Mexico from the State of Sinaloa in the extreme North-west to the State of Chiapas in the South. In Sinaloa, Jalisco, Durango, San Luis Potosí, Colima,

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Vera Cruz, Hidalgo, Oaxaca, Chiapas and Tabasco they occur, while the states of Guerrero, Mexico, Tlaxcala, Morelos, and Puebla are in large part occupied by them. In some districts Aztec is the common language. In the Republic there are probably more than 1,500,000 pure blood Indians who speak the Aztec language (this includes the Tlaxcalans). We have already in treating of the Tlaxcalans said much that is equally applicable to the Aztecs generally. Our physical study of the Aztecs was made at Cuauhtlantzinco in the State of Puebla. Considerable about them will be found in our *Mapa de Cuauhtlantzinco* and *Indians of Southern Mexico.* In the latter work at Plate XXXIV is represented an extinct geyser cone of sinter which stands in the open field, in sight from the tramway and railroad, between Puebla and Cholula. It is nearly or quite thirty feet in height and presents a neatly rounded form; the summit opening is nearly thirty feet across, and the walls at twenty feet down contract to about twenty feet diameter: at six or ten feet below this is the bottom, which seems to be lower than the surrounding level. From this bottom rises a mound of fallen rock and earth; among the debris scattered over this and the flooring are bones of animals and human beings. To one side of the crater bottom is a pool of bluish white water that yields a smell of sulphur. This interesting old crater is commonly called the *cuezcomatl* by the Indians, from its resemblance to their granaries. The weaving of wool, now an important industry at Santa Ana, in Tlaxcala was introduced there by a man named Barela. He was an honorable and honored man, who left money for supporting a girls' school, still in existence in Santa Ana. His wife was a selfish and avaricious woman. She objected to her husband's benevolence and was greatly hated by the people. When she died they tried to bury her body at the famous Sanctuario of Ocotlan; twice the earth rejected her. The body was then thrown into the river Sawapa, which immediately overflowed its banks and left her stranded on the shore. The Bishop then advised that the body should be thrown into the *cuezcomatl* which is believed to be the very gate of hell. It is said that the demons swarmed up from below to seize the corpse when it was brought there.

The dress of the Aztecs at Cuauhtlantzinco is not generally characteristically Indian except as regards the decorations upon the *camisa.* In some of the more remote pueblos it remains nearer the primitive condition. The women of Tlaxcallantzinco wear elaborately and pecu-

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liarly embroidered *huipilis* or *quichiquimels*. The women of many remote pueblos wear a skirt of coarse white cotton which is embroidered along the lower edge with geometrical designs in black and red. Over this, but short enough to expose the decoration, is worn an *enagua* of black wool, well woven, close and heavy. This is usually about three yards long and 2½ feet wide: along the upper edge is sewed a strip of cotton several inches (6 to 9) wide. This garment is simply folded around the body and held in place by a belt or *faja*. The most characteristic piece of woman's dress, however, both in the district of Cholula (state of Puebla) and in the state of Tlaxcala is the *camisa*. This is a low necked and short sleeved shirt or chemise of unbleached or bleached cotton. The neck slit and the edges of the arm openings and the sides are decorated with designs worked in red or blue; bands of cotton, separately worked with elaborate patterns, are sewed onto the *camisa* — one just at the neck border in front, a narrower one at the lower edge of the short sleeve and a third still narrower at the upper edge (shoulder) of the sleeve. Of course these two last are paired. These decorated strips are made up in sets, five making the set. Cholula is famous for the manufacture of these. Those made there are rather coarse, and are generally made with red or blue wools. The method of work is curious: it is not ordinary embroidery but it is practically weaving done with a needle. The colored thread is carried horizontally through the fabric; it passes under a certain number of the threads and over a certain number, etc. The patterns are left in white by passing under the threads that compose it. The work is tiresome and time consuming. Outside of Cholula, and common in Tlaxcala, we find much work done in the same way but with black silk — the result being smaller and more delicate. The patterns worked on these decorative strips are geometrical, birds, or animals. (Fig. 13, birds; 14, dogs; 15, birds, geometrical and plant.) Some of these worked bands from Cholula, with similar designs, are made by sewing different colored beads upon the band until the groundwork is entirely concealed. (Fig. 16, deer and floral designs.)

The ancient Mexicans had two kinds of drums—the *huehuetl* or upright drum and the *teponastl* or horizontal drum. The former was made in several sizes and was called by different names according to size. It consisted of a hollow cylinder of wood cut, anciently, from a single tree trunk: it was cut away below to give three supporting

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feet and had a membrane stretched across the top. The ancient ones were frequently elaborately carved. The *teponastl* or horizontal drum was cut from a single log, which was cut to taper toward the ends: it was hollowed out be'ow until the central part was a mere thin layer, which was then cut to two lips that were separated from each other by a narrow slit. These ancient instruments have largely disappeared: now and then, however, examples may be found in the Indian towns. The *huehuetl* is used on festival occasions at many Tlaxcalan and Pueblan towns. Fig. 17 represents a *huehuetl* from Cuauhtlantzinco which was claimed to be some thirty years old. It is constructed of boards set upright and united instead of being cut from a single block: it is painted a bright blue. It measures 2ft. 8 in. in height and 1 ft. 4 in. in diameter. The *huehuetl* is beaten with two sticks with padded ends. It makes a great noise audible to a considerable distance. The specimen shown is about the usual size. We do not know of *teponastls* in Tlaxcala, though curiously the *huehuetl* is erroneously called by that name in that region. It does, however, linger in Indian towns in various other regions. We have seen it about Lake Patzcuaro. Fig. 18 represents a *teponastl* from near Guadalajara. This is cut from a single log or block of heavy wood: it measures about 2 feet and 6 inches in length and some 8 inches in diameter at the end: the lips are 10½ inches long and 3 inches wide. The *teponastl* is beaten with a single padded stick, the two lips being beaten with it alternately or in proper time. (For further remarks on these drums see *Popular Celebrations in Mexico:* Jour. Am. Folklore; vol. IX (1896), pp. 162-163.) These drums when used in festivals are usually accompanied by the *chirimiya.* This is a pipe or horn of wood flaring at the outer end and with several finger holes along the side. Bandelier considers it an originally native instrument: Brinton does not. A *fiesta* band in San Juan Totolac (and in other Aztec and Tlaxcalan towns) comprises a *huehuetl*, two *chirimiyas* and a *tambour* or European drum. (*Inds. So. Mex.*, Pl. XLVII.) On the slopes of Malintzi the shepherds use a stringed instrument, the *camalpa.* It is the musical bow, which has been so interestingly studied by Balfour.* It consists here of a simple cane some three or four feet long: a string is fastened to one end of this and is rendered taut by a tightening peg at the other. It is played by vibrating the cord and manipulating with the mouth. Señor Quechol, who showed me the mode of use, believes from the name

**The Natural History of the Musical Bow.* Oxford. 1899.

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that the instrument is post-Conquest in Mexico. His etymology of the word is *cam*, mouth: *alpa*, corruption of the Spanish *arpa* (harpa) —a mouth harp. Balfour illustrates this identical form from Patzcuaro.

The Mixtecs.

The country occupied by the Mixtecs extends eastward from the Pacific Coast into the high mountain country of the interior. Their territory lies within the states of Guerrero, Puebla and Oaxaca but chiefly in the last. It is commonly divided into two districts — the *Mixteca alta* or high Mixteca and the *Mixteca baja* or low Mixteca. In 1876 Garcia y Cubas set the number of Mixtecs at 220,000; the present population must be considerably greater. The Mixtec language is the type of the Mixteca-Zapoteca Family of Orozco y Berra. It is a polysyllabic-polysynthetic language employing twenty-six elementary sounds in its words, which may reach sixteen or seventeen syllables in length. There is considerable use of nasals; two or even three consonantal sounds may come together and doubling of vowel sounds is frequent. Variation in length of sounds and intonation vary the meanings of words; words frequently begin with consonants and end with vowels. The language presents many dialects —Orozco listing eleven, of which that of Teposcolula is claimed to be the most important. Not only are different towns said to have distinct dialects, but even parts of the same town. The grammar presents some interesting points and has been well studied. The Mixtecs were independent of the Aztecs with whom they waged war before the Spanish Conquest. Tilantongo was an important central town. The Mixteca-Zapoteca had an interesting ancient culture. The two tribes, Mixtecs and Zapotecs, have mixed profoundly in the neighborhood of Oaxaca.

The land in the District of Nochixtlan, though high, is fertile and productive. Wheat and oats are the main crops. Much maguey is raised though it is rarely planted out in great fields, but only as division lines between land patches. The roofs of houses about Nochixtlan are often thatched with the *pencas* of maguey. A striking feature on the slopes about the town are the watch-houses, small shelters built of maguey *pencas* (leaves): they are of three forms — dome-shaped, conical, and ridged, and are barely large enough for one person to crawl under. They are lookouts from which watchers guard newly

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planted fields. In the plain immediately about Nochixtlan they give place to rectangular A-tent-like structures of *zacate*, grass, perched upon four supporting poles, which raise them ten feet or more into the air.

Tilantongo is about six hours, by horse, from Nochixtlan. In 1899 its population was 2,266. It is Mixtec, but the population has been greatly influenced by Spanish contact and mixed with Spanish blood. (*Inds. So. Mex.*, Pl. LV.) All speak Spanish as well as their native tongue. None of the men and few of the women retain native dress. The houses are well constructed (*Inds. So. Mex.*, Pl. LVI.— LIX). The walls are built of adobe bricks of a rich brown-red color: the courses of mud between them are rather thick, and into them — giving a distinctly ornamental effect — are stuck sharp bits of stone so that each brick is marked out by its surrounding line of pebbles. (*Inds. So. Mex.*, Pl. LVIIIa.) This is probably not decorative in intent. The roof thatching is of palm, heavy and substantial. The favorite finish leaves the stalks of the upper lines of thatching palms projecting a little and those of the two sides alternate so that a curious double comb or serrated edge is left along the ridge. Frequently the front slope of the roof is carried several feet beyond the front wall and is supported by four posts (*Inds. So. Mex.*, Pl. LVI) thus forming a sheltered porch before the house. There are no windows and the door is in the middle of the long, front, side. The ridge-pole runs lengthwise of the building and the two great slopes are from it; the roof, however, is four-pitched, smaller slopes cutting down from the ends of the ridge-pole. The three house idea is fairly observed here although there may be more than three houses, even six or seven being grouped upon a little space artificially leveled or cut out for their reception. The cooking house is often made of slabs set upright instead of adobe bricks and the granary is usually of logs set horizontally and built up in crib-work. Both are thatched with *zacate* or palm but less care is observed than in the other house. The roof framework upon which these thatchings are supported is carefully made of poles lashed together with strips of bark or other cord.

In so far as the Tilantongo women wear native dresses they have black *enaguas*, which are so long as to require folding into vertical pleats. These pleats are worn in front. This *enagua* is belted with a plain red girdle of considerable length usually bought in Oaxaca; the *camisa* is usually plain but may have some decoration at the neck-

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slit in red, rose, or green wool. A white cloth is often worn over the head, as a sort of *reboso*. Women go barefoot but wear a considerable amount of necklaces—of coral or glass metallic colored beads—and earrings. In a warm valley, over the mountains from Tilantongo and on the way to Tlaxiaco, at San Bartolo, women are characteristically dressed. All wear the black *enagua* pleated in front, special belts, other things as above mentioned, and elaborately decorated *huipilis*. The *huipil* is a characteristic garment worn by most of the women of the Indian tribes of Mexico. It is like a wide sack, turned upside down and slit along the bottom for the passage of the head and along the sides for the arms. It is long enough to fall to the knees but is usually caught up and girded at the waist. (*Inds.So.Mex.*, Pl. LXIV.) The neck slit is often edged with ribbon and there is embroidery decoration in bright colors but rather simple band patterns. (Figure 28.) The men of San Bartolo wear native belts; these may be eight inches wide and very long: they are closely and finely woven in narrow stripes of color and at the end are worked with considerable care into triangles of open mesh to which are tied tufts of bright wools; the favorite color combinations in these striped belts are red and white, red and black, red, blue and white. The belts worn by the women are not usually woven here but come from San Mateo Penasco or from Oaxaca. Those from the latter place are simple red belts like those seen at Tilantongo: those from San Mateo bear woven designs of some other color. The belts as worn give much the effect of those of the Tarascans, appearing as thick and solid encircling bands. This effect is not due, however, to the wearing of one over the other as there, but to wearing a thick belt of plaited palm to the end of which is attached a sufficient length of woven belt to go a little more than once about the body: thus the palm is concealed. (Fig. 30.) San Bartolo is strikingly beautiful and unlike Tilantongo. The houses are built of poles set side by side upright. They are arranged along two or three parallel streets and are embowered in dense masses of fruit trees—*naranja, lima, ahuacate, granada de china;* and *chirimoya*. Gardening is much practiced and spinach, lettuce and onions raised. The population is purely Mixtec and many do not speak much Spanish. Cotton is used in weaving, which is brought raw from the Coast country. The black *enaguas* used here and at Tilantongo are mostly brought from Magdalena de los Comalis, where their manufacture is important. They sell from 6 pesos upward. At Cuquila, a Mixtec town in the

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District of Tlaxiaco, the men wear rather thick and heavy woolen shirts (Fig. 32), which are home-spun and home-woven: the material is undyed. They also wear belts of the same material. At San Bartolo they make rain-coats in form similar to those of palm so commonly used among the *mestizos*, but made of cocoanut fibre.

At Yodocono, San Bartolo and other towns, they keep many bees. The bee hives are cylindrical foundations made of sticks tied together, which are then wrapped in matting and hung to the sides of the houses or arranged upon supports over which protecting thatches are constructed (*Inds. So. Mex.*, Pl. LVIIIa.b.) The braiding of palm is much practiced. Handsome mats are woven (*Inds. So. Mex.*, Pl. LXb). The *tenates* of this district are famous. They are braided from palm strips; some of these are stained black by smoke. They are woven into artistic patterns. These *tenates* are carried by everyone; a carry strap of palm is attached to them and carried over the forehead, while the *tenate* rests against the back. (*Inds. So. Mex.*, Pl. LIXa, LXIa.) In Mixtec these carry-sacks are called *do-so*, the straps *yu-tu* and the combined article *do-so-yu-tu*. At San Bartolo palm is braided into hats and mats and the town officials when in the town-house are usually braiding. At Yodocono there is an old woman who weaves handsome and durable silk belts; they are woven in two solid colors — crimson and saffron yellow. We have already mentioned the cotton weaving at San Bartolo and the wool weaving at Magdalena de los Comalis. The former is done by the women: men are the weavers of the famous black *enaguas*. Magdalena de los Comalis is named from its trade in *comalis* or earthen griddles, of good grade: some dozen or fifteen men are engaged in this manufacture. As many more men at the same place make a polished red pottery, not glazed, which is usually in the form of censers, candlesticks and trays: at this town also they braid palm hats, but make no *tenates* or *petates*. At Cuquila they make a rather coarse grained but clean brown unpolished ware into large bowls with flaring slanted walls and finely shaped *ollas* or water jars more smoothly finished and of darker color. Men are the potters and they work by hand. A log, smooth, and flat on opposite sides, forms a table at which the work is done; a small square board serves to support the work and can be turned around as the shaping proceeds: the lump of clay and little gourd scrapers lie on the log table; the man sits while working upon a block of wood. When the scraper is used in smoothing or shaping the free hand is

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held to support the part of the side opposite the point of working. When the vessel is shaped up, the edge is trimmed neat and square with a curiously skillful movement of the thumb nail, starting and carrying it right around with no hint of uncertainty to the very same point. The vessels are allowed to dry from ten to fifteen days after being shaped before they are burned. There are no permanent, special ovens for baking pottery. These great potteries of Cuquila are much exported and one constantly meets parties carrying them on the highway between Cuquila and the Pacific coast. (*Inds. So. Mex.*, Pl. LXIII.)

Cuquila is high in the mountains and the nights are much colder than at Tilantongo. The houses are log huts, but they are rarely close-built. The *temascals* are rather characteristic; they are rectangular, low, and flat topped; the sides are of stone and mud and the top is of logs daubed with mud. The entrance is small and rectangular; the person intending to take the bath can enter more easily by backing in, lying flat, than any other way. The little firing oven is at the rear and is irregularly half dome-shaped.

At Tilantongo, where we witnessed a funeral procession, they rarely use coffins: while burials commonly take place in the *campo santo* or consecrated ground the priest is but exceptionally informed of the death or asked to officiate. The grave is large, deep, and rectangular. Two men go down into the grave to receive the body which is lowered to them with lassos. A cross of lime is marked out on the bottom where the body is to lie. A piece of matting is placed over the face and dirt is then shoveled into the grave. A vessel of water and money is placed with the dead for his use; sometimes other objects are buried with him. On the first high ridge on the road from Tlaxiaco to Chicahuastla there is a considerable cairn, built of small stones and with a cross surmounting it. (*Inds. So. Mex.*, Pl. LXII.) Such cairns are not rare in the Mixteca and each Indian passer usually adds his contribution. They believe that foot weariness may be removed by rubbing the foot with one of these pebbles.

Triquis.

Orozco y Berra, our best authority generally in regard to Mexican ethnology, was completely in error in regard to the location of the Triquis. He says: "Unclassified language. In the report of the

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Curacies the four populations which speak Triqui are confounded with the Chontals, which is inexact. The pueblos correspond to the Department of Tehuantepec and are: Huamelula, Astata, Tequixistlan, Tenango." In accordance with this idea two small color patches on his map, near the sea coast, mark the location of the Chontals and Triquis, not far from Tehuantepec. The whole matter is error. The towns he mentions are none of them Triqui. Three are Chontal and the fourth (Tenango) is perhaps Zapotec. Tenango should be included in the patch of Zapotecan coloration and the other two patches should be uniformly colored for Chontal. The real district of the Triquis is situated in the high mountains of the District of Tlaxiaco and Juxtlahuaca, perhaps 200 miles in a direct line from Orozco's location. Recently Belmar has printed a little work on the Triqui language. [Ensayo sobre la lengua Trike. Oaxaca. 1897. 16mo. pp. 53.] It is probably the only treatise upon that language in print. He mentions six towns as Triqui towns, but erroneously: there are but five. They are San Andres Chicahuastla, Santo Domingo Chicahuastla, San José Chicahuastla, San Martin Ytunyoso, and Copala. All but the last are in the District of Tlaxiaco; Copala is in the District of Juxtlahuaca. San Miguel Chicahuastla, mentioned by Belmar, is really Mixtec in language. These five towns probably have a population of less than two thousand souls and they form a little island of Triqui speech in the midst of a Mixtec area. I am assured that Copala has a dialect different from the others, though comprehensible to them. The people of Copala are also distinguished by dress and are said to be neater and more conservative than the other Triquis. Belmar gives in his *Ensayo* a brief sketch of the grammar, a list of phrases in Spanish and Triqui and a Spanish-Triqui vocabulary. The language requires an alphabet of twenty letters. Abundant use of prefixes is made for producing grammatical variations—as number, diminution or augmentation, sex, gender, case, etc., etc. Belmar considers the language related to the Mixtec and therefore a member of the Mixteca-Zapoteca family.*

San Andres Chicahuastla is the Triqui town where our own work was done. It is beautifully located on the very crest of the Sierra Madre and on a bright clear day the Pacific, perhaps seventy-five miles

* It does not seem to us that enough is gained by the operation to make it worth while to apply the Powellian ideas to Mexican linguistic nomenclature as Mason has suggested.—*Am. Anth.* 1900. pp. 63-65.

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away, can be seen. The town suffers in day time from heavy cold mists that sweep up from the coast and at night is exceedingly cold. Perhaps as the result of their unfortunate climatic conditions, the people are given to drink, by which they have been fearfully degraded. The town is most picturesque. Many of the houses are circular, others rectangular. The walls are composed in either case of poles set upright at suitable intervals, across and upon which are horizontally lashed poles a few inches apart. These are then daubed over with clay. The rectangular houses are thatched with far-projecting, low-sloped thatch of *zacate* (or more rarely palm). A special capping of *zacate* thatch straddles the ridge line and is held down by poles lashed in position; the outside of the walls are often repaired or strengthened by *zacate* laid on vertically and held in place by horizontal poles lashed in position. The round houses are handsome structures often about twenty feet in diameter. The walls are built as above described but the roof-thatching is done in part with palm: these circular roofs slope quite abruptly and are much higher than those of the rectangular buildings. The palm thatching is laid on in several layers from below, one overlapping the other and the edges being trimmed so as to present several well defined concentric circular lines. These bands may vary in material—palm or *zacate*. Where the thatch comes to a point above it is securely tied, two cross-sticks thrust through the mass and projecting at their ends furnishing good support for the lashing cords. This point of thatch is frequently capped by an *olla* or water jar turned upside down: the object is to better shed the water and prevent its destructive action upon the ends of the thatching material. Storehouses and pens are found with every house and are usually circular; they are made of poles planted side by side and lashed together by strips of bark or withes which are used in alternating pairs going under and over alternate poles. The roof of such a circular storehouse is circular and may be, though rarely, capped with the upturned *olla*. Many granaries are rectangular, composed of logs built up as a crib-work, but the roof is generally circular. These various houses and outbuildings are arranged in groups of from four to ten upon artificially plane surfaces prepared for them by cutting away a slope. (*Inds. So. Mex.*, Pl. LXIX-LXXII.)

The men are dressed in unbleached cotton, much of it of coarse texture and made in the village. The *cotone* or shirt is short, square cut at the waist; the neck opening is cut to a rectangular form. There

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are sleeves but the sides are not sewed together. An idea of the garment will be secured as follows: take a rectangular blanket of small size: fold it midway and sew the corners together along the sides for a little way up from the lower edge: cut out a central rectangular hole from the line of folding and hang a pair of sleeves at the corners. (Fig. 32.) The trousers are of the same material. The feet are usually bare but sandals are somewhat worn. The trousers are usually rolled up to expose the larger part of the legs. The *cenidor* or belt for men is made by the women and is of white cotton with red, or blue, or red and blue narrow transverse stripes usually in threes; the ends are decorated with red or blue cotton bands which are embroidered in rainbow hued wools in running patterns. The *sombreros* most worn are of black wool rather high crowned and are bought in Tlaxiaco, for one peso fifty centavos; they are so rarely worn by others than Triquis as to be almost characteristic. Men, women, and children, through a great part of the dismal and damp days, shiver in dull grey and whitish serapes, cross-striped near the ends with dull grey: these are made at Yolomeca. The dress of the women is characteristic and of local manufacture, except the belts which are bought in Tlaxiaco for from one to three reales. The *huipilis* are of white cotton, woven close or in openwork. They are long and of good material, but bear comparatively little decoration: narrow bands running horizontally are outlined by colored threads woven into the texture and then decorated with diamonds, zig-zag lines, rosettes, etc., in colored wools; a pair of vertical lines (one on each side of the neck-slit) are needle-worked with colored wools; just below the neck-slit in front (and sometimes behind) is a transverse band several inches long and about two inches wide which is worked solidly with different colored wools in rather attractive patterns (Fig. 33). The *enagua* is eminently simple. It is a strip of striped cotton, heavy and closely woven; this is scantly wide enough to reach from the waist to the knees and scantly long enough to wrap about the body with a little overlap. There is no spare material to be thrown into vertical pleats as in the dress of Tarascan, Mixtec, or even Aztec women! (Fig. 34.) The favorite colors of these striped dresses are blue, white, brown and black and they present little variety. (*Inds. So. Mex.*, Pl. LXXIV and LXXV.) Combs for the hair are much like those used in the lower hot lands of the Pacific coast generally. They are made of a number of thin strips of bamboo or other flexible material placed side by side, bent around,

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and held in place by inwoven wrapped bands of fibre: this may be so handled as to give pretty decorative effects. Women usually wear nothing on the head or feet.

Women spin constantly. The spindles are rather long and slender doubly pointed sticks that are thrust through slender somewhat top-shaped spindles of clay. (Fig. 38.) Sacks or bags for maize, beans, etc., are made of a striped cotton of home manufacture. This is of dirty white and buff or yellowish color: a strip is taken, of suitable size, folded once transversely and then the edges are sewed together and embroidered with zig-zag lines of color. (Fig. 35. The position in the engraving is wrong. Hold it so that the number is at the left hand of the illustration.) For carrying *tortillas* neat cloths are made: they are always made of two narrow strips of cotton, which have a stripe of red or blue along one edge. They are placed side by side, with the color edges together and seem to form one piece. The line of junction is embroidered with a running zig-zag of colored wool. Horizontal bands, marked out in the texture by inwoven blue or red threads have triangles, pyramids, diamonds, zig-zag lines, etc., worked in them with colored wools. Sometimes the designs thus worked in are highly formal and conventionalized human figures. (Fig. 36.)

Tenates are simple and strongly made of palm. In the mean little plaza or market place of Chicahuastla comparatively little money passes: much bartering takes place. Traders bring loads of sugar and of fruits (especially pineapples) from the lowlands, and men from Cuquila stop with their great loads of *ollas* and bowls on their way to the coast. The women of the village offer *tortillas* or eggs in trade: if their unattractive wares are not wanted they turn sorrowfully homeward.

Zapotecs.

The Zapotecs held an extensive area to the east and west of the old Mixtec territory. They were a powerful tribe and were frequently at war not only with the Mixtecs but also with the Aztecs. At the time of the Conquest they had been suffering more or less degradation at the hands of these powerful foes. Their territory extended from Oaxaca to Tehuantepec and Xoconochco. Garcia y Cubas gave the total Zapotec population in 1876 at 239,600. It must now be considerably greater. Juan de Cordoba who wrote a Zapotec *arte* in 1578 says: "it is now to be noted, that among all the pueblos that speak

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this language, even those purely Zapotec, there is no pueblo which does not differ from others somewhat — little or much — one placing certain letters for others and another in this that though speaking the same words they are used in different senses." Orozco y Berra gives his list of Zapotec towns in the State of Oaxaca, under six headings on account of well defined dialectic differences. Not only is the Zapotec of Tehuantepec different from that spoken near Oaxaca; but San Blas which adjoins Tehuantepec and the town house of which is not ten minutes walk from that of Tehuantepec speaks a different dialect from the latter. (See Bul. IV, Dept. of Anth. Univ. of Chicago.)

San Blas and Tehuantepec are mutually distrustful. Not only are these adjoining municipalities dialectally different: they are different in political spirit — thus they were on opposite sides in the Maximilian affair. San Blas is now enjoying considerable prosperity and is buying land constantly. To-day their property extends almost to Huilotepec some four leagues away.

Many of the Zapotecan villages are large. Typical is a town, now quite familiar to the tourist, Tlacolula, not far from Mitla. Though in general like the modern town of Mitla it is far more thrifty and well built. It occupies a level space of fertile soil; the town is laid out with straight intersecting streets: the houses are set in large yards, which are separated from each other by carefully planted *organo* hedges. Some of the yards are veritable gardens and a common crop is *nopal*, i. e. the prickly pear cactus, the broad, flat, round, leaf-branches of which are used for feeding animals and as a salad for human beings. There are many fine oxen kept here and at almost every house is an ox-cart. These are heavy affairs, usually with two thick, solid, clumsy wheels, and often with a protecting top of matting. The ox-cart is to be found, abundant and picturesque, in every part of the Zapotec district except the most mountainous. The houses are rectangular, single-roomed, but of large size. At the corners are set tree-trunk posts: others are set at suitable intervals between these. The walls are made of cornstalks or canes set close together upright and lashed together and to horizontal strips of the same material by bark strips or leathern thongs. There are but three or four or these horizontal lines and they are placed on the outside of the walls. The doorway is in the middle of one long side and the roof is four-pitched — two small pitches at the ends and two larger ones over the two long sides, meeting along the ridge pole. The roofs are high and rather

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abruptly sloped. The framework upon which the *zacate* thatch is supported is made of poles lashed together. The central pole of the end slope supports projects upward; about it a horn of thatching is carried up and protected by an upturned *olla*. These projecting olla-capped horns are picturesque features (*Inds. So. Mex.*, Pl. LXXXII). At Mitla the houses are much the same but less carefully built. In towns like Santiago Guevea (*Inds. So. Mex.*, Pl. CI) the pitch of roof is a little steeper, and there are no olla-capped horns. In Huilotepec and other places near Tehuantepec the enclosed yards are surrounded by high close fences of canes and a large part of the yard may be roofed over with an awning of canes: these structural features are protective against heat and blowing sand. Throughout the Tehuantepec district thatched roofs supported on corner posts but without side walls are frequently constructed near houses and are used as airy places for work or lounging during the day — and sometimes as shelters over the hammocks at night.

Dress among the Zapotecs varies with locality. At Mitla and Tlacolula the women wear a white cotton *enagua* folded about the lower body and held in place by a belt or sash; the *camisas* are made of cotton bought from the *tiendas* and are of the usual form—little short shirts, with hardly any sleeves. Much time and labor are bestowed upon their decoration with needle or by drawn work. These patterns are not made in colors and sometimes upon a single little sleeve, hardly more than covering the shoulder, there will be eight or nine bands of drawn and needle work, each different from the others. The dress described is that worn at home or work; on gala days or when going to town the plain cotton *enagua* is covered by a heavy woolen one a yard or more wide and three yards long, enough to go around the body twice with a few coarse pleatings. There are two kinds of these *enaguas* or *mantas*, one of plain black, the other a crimson red, plain or with black stripes. At Mitla these *mantas* are woven, under the trees, with the old and simple device so often represented in the ancient Mexican manuscripts. The warp threads are fastened at one end to a tree or post, at the other to the belt of the weaver or to a strap passing behind the body. The weaver may stand or sit while working, but the threads are held taut by his own weight. A few sticks and loops of string serve to hold the threads apart, to pass the woof threads through the warp, to separate and reverse the sheds, and to beat home the passed woof thread. This style of weaving is found at many places

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in Indian Mexico and will be repeatedly referred to. At Mitla this is the prevalent method; at Tlacolula the *mantas* are made chiefly on old-fashioned Spanish looms. Usually the man who weaves black *mantas* does not make red ones and *vice versa*. Prices vary with size: from 6 to 20 pesos. The dyes are home made. For the black *mantas* they use the leaves of a tree or shrub which they call *hojas de tinta negra*—black dye leaves, which grows locally; the other leaves called *hojas de tinta*, dye leaves, they purchase. The *mantas* are usually woven in rather narrow strips and two are joined side by side, the junction being decoratively stitched with colored wool. Women and girls wear the ordinary Mexican *reboso* but have a characteristic way of folding it and laying it on the head with the ends hanging down. (*Inds. So. Mex.*, Pl. LXXXV.) The hair of the women here is in-braided with colored cords, green, black, and a purplish red being favorite colors although there are also narrow purple or blue ribbons with flower patterns worked in them. These are not made here but are brought from Ocotlan, Oaxaca (the simple cords) and from Tuxtla Gutierrez in the State of Chiapas (the flowered ribbons). Shoemaking —if we may use the term—is a special trade in the Mitla region; the shoemaker dresses his own skins, which are chiefly those of deer; he also colors them with a bark which is brought from the mountains. Men's "shoes" consist of a simple sandal sole, with a string passing between the great toe and its neighbor; this sole is thickened and heeled behind and has a flap of leather so sewed to it as to protect the wearer's heel and fold over the upper surface of the foot, in front of the leg; it is there fastened with a little thong to which the upper end of the toe string is tied. (Fig. 39.) The woman's foot gear is still stranger: to the sandal sole, heeled or not, is attached an upper piece of leather which protects the heel and ankle. To its sides above and in front is attached another piece of leather which covers the upper surface of the foot except the toes. This has eyelets for lacing like our own shoes. (Fig. 40.) It is, however, quite fair to state that these women usually go barefoot, while the men generally are sandalled.—The dress of Tehuantepec women is famous, striking, and becoming. These women have fine forms and features and have often been called by travelers the handsomest women in the world. Two *enaguas* are favorites, made of heavy cotton closely woven. One is a rich and beautiful red; the other is a purple—more or less a violet (see The Chontals). Over the upper body is worn a *huipilili* (little *huipili*)

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which is of light cotton print stuff bought in the market: some shade of brown, purple, or red is favorite and the most prized are apt to have large white dots or spots. These are scant; they have no true sleeves, are low-necked and usually too short to reach the girt *enagua*, so that a strip of brown skin appears between the two garments. The *huipil* is a marvel. It may be of muslin or of a kind of lace. It is made with full length sleeves: it should be worn as a jacket or shirt over the *huipilili*. It may be white, delicate blue or, if of lace, brilliant green, red, or even yellow. To the neck, the borders of the sleeves, and the lower border of the garment wide ruffles of pleated lace, heavily starched, are attached. (Fig. 48.) It is rare that the garment is worn as a *huipil;* usually it is turned upside down, the wide lower border is thrown so as to surmount the face with a wide divergent fringe while the body, sleeves, collar, and wrist ruffles dangle down the back. The effect is striking and many travelers who have seen it have described it as a head-dress. When the lady goes to church she draws the *huipil* over the head, as if intending to put it on, as its original plan required. When the collar just surrounds the face, framing this in an oval frame, she stops—she knows the effect is good. It is but rarely that the garment is really *worn*. These women of the Tehuantepec region are fond of decoration and in the fine old days of Tehuantepec's prosperity they were gorgeous to behold. They delighted in wearing gold coins. Small ones were made up for earrings; others of all sizes were strung into necklaces and it was formerly not uncommon to see a woman with several hundred dollars worn in this way. Now, however, such sights are rare. In the hard times through which they have been passing the prized coins have been sacrificed one by one. At San Bartolo, on the high road from Tehuantepec to Oaxaca, the Zapotec inhabitants are conservative and here both men and women wear characteristic dress. It is said that until quite lately the usual dress of the women was too scanty to meet the approval of the Jefe who with some difficulty has brought about the habit of wearing the *huipil* on ordinary occasions. This, however, is really at times a marvel. Figure 42 inadequately represents one made of fine cotton, carefully woven in the ancient fashion: it is long enough to reach to below the knees and is magnificently embroidered—especially in its upper fifth with lines of elaborate but small designs in silk — double-headed eagles, birds, dogs, men on horseback, etc. This garment represents many months of work and the silk with which it is embroidered,

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brought from the mountains and dyed with cochineal, cost a half-peso an ounce. These women often turn the *huipil* upside down and throw it over the head so that the main part hangs down behind—*a la Tehuantepecana.* The lack of the wide ruffs of lace, however, prevents this from any artistic quality and the effect is baggy and ugly. The men wear short *camisas* of white cotton and loose trousers of the same material. These are home woven and many of them bear patterns representing lines of figures: these are usually in pale reddish or purplish colors, or in white. The latter are almost labor thrown away, as they are visible only on careful examination. (Figs. 43 and 44.) The men here wear low-crowned, wide-brimmed, black hats. Their belts are of red cotton: the yarn is purchased and the weaving done here. Near the ends they are worked with silk patterns—unfortunately not appearing in Fig. 45. Men of San Bartolo frequently wear overtrousers of skin slit at the sides. (*Inds. So. Mex.*, Pl. CIV.) They carry red cotton cloths with black line checking for *panuelas* (handkerchief, neckcloth, carry-cloth). The women have white cotton *tortilla* cloths—napkins with embroidered patterns.

The Zapotecs of to-day are really, like their ancestors of the past, among the most pleasing Indians of Mexico. They are intelligent, industrious, acquisitive, and progressive. In many of their towns the municipal building is creditable. The tribe has produced men eminent as political leaders, soldiers, and scholars. The great President, Juarez, was a full-blood Zapotec. The Indian Secretary of San Blas (district of Tehuantepec) has written and published a grammar of his native dialect (see Bul. IV, Dept. Anth. Univ. of Chicago), which is creditable. On the whole it must be admitted that in the Tehuantepec region the women appear to have more energy and quicker intelligence than their husbands. They appear to decide most matters of importance and are the usual "spokesmen" of the family. In this region night journeying is common on account of the daytime heat. The traveler meets a constant line of ox-carts, each usually carrying a whole family. Should he ask his way or inquire for any information it is generally the woman and not the man who responds. The great market at Tehuantepec is one of the busiest and most attractive in the Republic, but all the sellers under the roof are women. It is claimed that no man would venture to sell there, or—if he did—that the women would drive him away.

We have already mentioned some of the arts and industries of the

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Zapotecs. Fine deep baskets called by the Aztec name *chicahuite* are made at Tlacolula and elsewhere. (*Inds. So. Mex.*, Pl. LXXXVI.) The material, which is cane, is cut into long strips, which are laid out in the sun to dry before being worked up. These baskets when in use may be carried on human backs, or in pairs may be hung upon *burros*, one on each side. In the markets at Oaxaca several native wares in pottery are sold; the most interesting are an unglazed black ware, and a brilliantly green-glazed ware. The former is made at Coyotepec. Large *ollas*, pitchers, cups, bowls, strainers and bottles are made in it (Figs. 21, 22); also many types of toy whistles and bells with a clear and pretty note. (Figs. 20, 23, are bells; 24, 26, are whistles.) Such forms as 24 in their general art idea, tripod support and position of mouthpiece are strictly comparable with many ancient whistles from the old Zapotecan graves and village sites. (Fig. 25, on much smaller scale than the others.) This black ware is sold at remarkable cheap prices. The green-glazed vessels are of a clean yellowish ware, much like that of our flower pots; their cost depends upon the extent of surface glazed and the richness of color of this glaze. Cups of all sizes and forms, bowls, teapots, tripod censers (Fig. 27), are common forms of utility. Wee vases, cups, pitchers, etc., are made in graceful forms and with wonderfully deep and rich glazing; the variety of these little toys is astonishingly great. Small whistles in forms of birds and animals are made in this ware but usually with but thin and light colored glaze. I am informed that this ware is wonderfully refractory and that cups made of it serve excellently for crucibles. The green glazed ware is made at Azompan. Speaking of whistles, simple cane whistles, *pitas*, are much used in Zapotecan celebrations, and *chirimiyas* (Fig. 41, from Mitla) occur.

The following legend is told at Tehuantepec. The name means "the hill of the man eaters"—i. e. lions or pumas. Long ago the Zapotec tribe living here was in great distress on account of the many lions which lived on a hill near by and killed and ate many persons. In danger of extermination they sent to consult the Juaves, famous for their *naguales* (sorcerers). The oldest and most skillful *nagual* performed certain incantations and then announced that a preserver would come forth from the sea. Soon there crawled out upon the shore a gigantic and terrible turtle. Slowly the monster made his way inland until he reached the foot of the hill of the lions, where the mere sight of him turned these into stone. The Juaves were aghast

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at the fearful power of the being which their magic had evoked and at once performed new incantations by which the turtle also was petrified. And to this day a double row of stony lions may be seen on the hill slope, and the turtle rock at its base — all bearing witness to the verity of the tale. There are many beliefs regarding *naguales*, pagan practices, birth customs, etc., among the Zapotecs regarding which my notes give little that is new. One practice I have on the best authority relative to marriage. At Tehuantepec and Juchitan on the morning after a marriage, the bloody sheet from the marriage bed is wrapped up, wound about with a colored napkin and placed in a small basket, which is carried through the streets on her head by an old woman, who is followed by music and a company of friends. She goes first to the house of the girl's mother, then to that of the girl's god-mother where the evidence of the bride's virginity is triumphantly shown. Later she carries it to the houses of friends. The custom is now passing away in Tehuantepec but still is fully observed in Juchitan. The evil eye is believed in at Tehuantepec. On one occasion I visited a gentleman who has a native housekeeper and who has many of the parrots and other birds of the country for pets. I expressed much admiration of these and presently in distress the housekeeper called my host aside and warned him that my admiration and attention would work the creatures harm — that they would all die. The belief that deformities like harelip and defective members are due to the eclipsed moon hold good here and mothers about to give birth to children should bind a key or any piece of iron next their body, under the belt, to protect against this misfortune.——Cairns or pebble piles are somewhat heaped up along mountain roads in the Zapotec area and often earthen censers or little circles of stone which serve as substitute for them may be seen upon wayside rocks where copal has been burned — usually before a cross. The former cura at Mitla Francisco Reyes told me that a cross near Mazatlan is much revered. On the ground near it are outlines made with pebbles; these represent houses, corrals, etc. They are in the nature of *ex-votos*, or sympathetic magic, and are constructed by those desiring good fortune in building a new house or with their animals.

The Mixes.

It is improbable that the Mixes have notably gained upon the population of 26,000 allowed them by Garcia y Cubas in 1876. Their

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villages are in the Districts of Yautepec, Villa Alta and Tehuantepec. The people are conservative in the extreme and only wish to be left quite alone. They were never reduced by the Aztecs or Zapotecs and barely by the Spaniards. They live in a magnificent mountain region and their towns are on the heights. With few exceptions it may be said that they are in one of three lofty positions — (a) on the very crest of ridges, (b) just below the crest, on the slope, where they will be sheltered from the wind or (c) on the crests of high spurs jutting out from main ridges. Probably many of their town sites are ancient: before the Conquest many Mexican tribes built their villages upon the heights but under Spanish influence removed to the plain or valley. The Mixes have not yielded to this influence. The roads of the Mixes are notable in going as directly up and down the mountains as it is possible to carry them; roads in the country of Zapotecs and most other tribes wind and curve and make great zig-zags. While these roads are not cart roads they are fairly cared for and in many cases logs are carefully set crosswise of them to prevent wash. At stream crossings there are not infrequently *hamacas* or *liana* (vine) bridges for foot passengers. These are swung across from tree to tree: two long vines bound together form the foot path; parallel to it are three or four stout *lianas* on either side; these are lashed into position by other *lianas* and form sides, the top ones being hand rails: from these hand rails long *lianas* slant upward to branches of trees where they are made fast thus anchoring the bridge and preventing its swinging. (*Inds. So. Mex.*, Pl. XCVI.) The Mixes have a generally bad reputation with outsiders. They are frequently characterized as filthy, stupid, and vicious. They really are suspicious of and timid toward strangers, and unusually superstitious. Few Mixes speak Spanish well and in some towns the women and older men practically do not use that language. Their own language is harsh and guttural. It requires eighteen letters for its writing. Combinations of two or three consonants and doubled vowels are frequent. Verbal nouns are extremely numerous. Orozco y Berra does not attempt to classify the Mixe, but Charency and others have shown its relation to Zoque and the two form a Zoque-Mixe family. The Mixe language is fairly uniform: Ayutla, Juquila, Ocotepec, Quesaltepec, Camotlan, Ixcuintepec, Coatlan — the towns which we have visited appear to speak much the same. Our carriers from Juquila had no difficulty in making themselves understood in all. Totontepec is asserted to have a notably peculiar dialect.

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The house architecture of the Mixes varies, from town to town, with the topography. They are everywhere rectangular, quite large and neatly though heavily thatched with a *zacate* thatching that projects well around the whole house and is trimmed square at the edges. It is capped by a heavy crest or comb overlapping the ridge Farm houses near Ayutla are well built log-houses: at Ayutla they are neat purplish red adobes, with single-sloped tile roofs; at Quesaltepec and Ixcuintepec the walls vary but are usually of adobe and poles: some consist of sections of adobe clay built one after another: others are double, of poles, between the two sets of which adobe is packed in; some are of poles and sticks the interstices between which are filled with ferns and leafy boughs, and twigs; others consist of poles and sticks set upright and lashed together; a few have the lower half of clay while the upper part is of upright sticks bound together. (*Inds. So. Mex.*, Pl. XCII, XCIV.) Neat granaries are seen in most Mixe towns: they are commonly built of logs arranged in crib-work, set well off the ground on four posts and thatched. At all the towns considerable attention is paid to agriculture. At Ayutla maize and peas are important; *ahuacates* are much raised; at Juquila there is little maize. At Quesaltepec and Ixcuintepec coffee is raised. Bananas, zapotes and oranges are cultivated at several towns. There are few arts. Women do some weaving of cotton; at Tamasalapa they make a common black pottery into *ollas*, bowls, etc.: a common and rather characteristic form is a stomach-shaped water vessel of perhaps a quart or more capacity. Mixes are famous carriers and it is asserted, I believe correctly, that they never go without a burden. If when they have carried charcoal, pottery, coffee or fruits to Oaxaca they find themselves without a burden of value they will load up with stones. If this is true the practice is not so stupid as it might at first glance appear.

Considering the religious and linguistic conservatism of the Mixes they are surprisingly non-conservative in dress. Not only men but women go largely clad in stuffs from outside made up after "civilized" fashions. Some of the women of Tamasalapa wear a dull blue *enagua* which is bought in Oaxaca: and in Camotlan they are said to wear a white green-striped *enagua* also made at Oaxaca. At Coatlan the women are rather strikingly clad: they wear a *huipilili* just like that of the Tehuantepecanas and a blue *enagua* which is said to be bought in Tehuantepec: the belt is also foreign; the *huipil* however is of local

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manufacture. It is of white cotton. It is divided by vertical red stitching into three sections, the upper part of which — above and below the neck slit is embroidered with red ornamental bands. (Fig. 46.) The hair is heavily braided in with reddish brown cords and the thick braids are wound around the head in a wide ring or band. (*Inds. So. Mex.*, Pl. XCV, XCVIIa.) The whole effect of dress and hair-dressing is that of Yalalag, a Zapotec town far to the north in the district of Villa Alta. Why it recurs here I do not see.

There are many survivals of pagan custom among the Mixes; Colzocon, Margarita, Alotepec, Coatlan, all have bad reputations in this direction. Worst of all however are Tamasalapa and Mixistlan: it is said that "even when the Archbishop was at these towns no one presented himself for confirmation; they are a law to themselves and practically recognize little authority in Jefe or Archbishop." At Colzocan it is said there is a little Christian shrine, *behind* which is an idol to which offerings are made: these consist of *tortillas*, fruits and fowls. At Quesaltepec and Alotepec a turkey or hen is killed by cutting off its head and the freshly sowed fields are sprinkled with its blood to ensure fertility. In doing this the following formula is repeated—

> I am about to kill thee and to
> sprinkle thy blood in the field
> that the crop may be here.

Brujas or witches are numerous: in fact some towns are reputed to consist of nothing else, as for example Alotepec. At such towns peddlers and traders have a hard time. If they are not satisfactory in their prices, the *bruja* meets them, transformed into a "lion" or a "tiger," after they leave the town and kills and devours them! The well known American naturalist, Mr. E. W. Nelson, tells me that on the summit of the sacred mountain Zempoaltepec there is a place of sacrifice — especially for turkeys. He saw the people going there on the proper day carrying their fowls. On one occasion he found the spot with a great pile of turkey feathers scattered about and many broken censers. At San Juan Guichocovi he says there is a great rock on which young hunters must place the skulls of the first game they kill: they must under no circumstances eat the meat of these animals.——It is not easy for the hurried traveler, busied with other matters, to get absolute information of sacred caves, still less to visit them. There are undoubtedly many such. We were told of one near Ocotepec. Our *mozo* who was usually reliable told us of such

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elsewhere. One on the crest of Coatzocualpa is visited by Mixes from Chiomas, Candellon, San Perdito, Josocon and Mixistlan on September 1st: thither they bear as offerings turkeys, candles, *tortillas*, etc. Another sacred spot known as the Cerro del Gallo lies to one side of the road from San Miguel to Santiago Guevea. This is *not* in Mixe territory. To it, on January 1st, flock great numbers from Tapachula, Tonala, Pijiapa, Ixcuinta and Comitlan. As my informant puts it these towns "*pertinecen al Cerro de Gallo*" (belong to the Cerro de Gallo — in the same way as churches belong to a diocese). If this statement is exact it is at once astonishing and interesting: the towns mentioned are far distant and the fact of their population making pilgrimage to this spot would hint at former residence hereabout and distant migration. On the same day, January 1st, the people of Juchitan, Tehuantepec, Chivitan, San Geronimo, Los Tablones, Santa Maria, Juntepec go to a cave between the *Cerro de Relampago* and the *Cerro de Cuezcomatl* to one side of the road from Tehuantepec to Narro where they leave their gifts. Feliciano was there one January 3d and saw the ground covered with candle-tips, *tortillas*, etc. If the pilgrims may hear thunder at the time of their visit the occasion is particularly auspicious. These last two sacred spots are not Mixe.

Archbishop Gillow of Oaxaca, in his interesting book *Apuntes Historicos*, devotes one chapter — the tenth (pp. 203–212) to the "Idolatries and superstitions which yet exist in the pueblos of Caxonos and its vicinity." As this book is little known in this country we translate the greater part of this chapter. The description of the finding of an idol of wood in the church at Mixistlan we have already translated and published elsewhere. (The Open Court, July, 1899, pp. 387–391.) This idol is a cylindrical box of wood, with a lid fitting over it. It is 1 foot 6 inches high and 8 inches in diameter. The front bears a carved human figure, with eyes closed and mouth open; the left hand is open on the chest, while the right grasps some object — perhaps a knife: an apron hangs from the waist *or* some object like a drum is held between the feet: animal figures, perhaps lizard-like dogs are at the sides: heads of serpents with parts of bodies are carved near the top, just below the lid. The idol has been painted with red and bluish green. From the complaints made by the people and from some points in the carving it is quite likely that this idol was a god of water. (*Inds. So. Mex.*, Pl. XCVIIb.) Archbishop Gillow after giving the history of this idol goes on to say:

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"The Presbyter Juan M. Muñoz Cano, at present cura of the Sagrario of the Cathedral of Oaxaca, found himself at the town of San Pablo Xaganisa, belonging to the parish of Caxonos. They took him to a spring, which irrigates the pueblo: this spring is in a sort of cave from which the water pours forth abundantly. He had been assured, a little before, that this was a place of idolatry and, having arrived there, he ordered some of those who were with him that they should enter and see what was in the cave. All were young Indians; and on his telling them that they should bring out 'the saint' which was in there, they were overcome with surprise and were inclined to refuse to do his bidding: but urging them again, and calling the idol which he believed to be in the cave 'a saint,' two boys crept in and, in a little time, brought out an idol of stone, about a foot high — also a brasier of clay with charcoal upon it, and some feathers of a turkey. He then took the idol in his hands and after having made some explanations (so far as he could, being ignorant of their language) in order that they might have a horror of the idol and every sort of idolatry, he broke it to pieces before them.

* * * * *

"They also practice magic, sometimes killing each other by means of it; they make use of certain ceremonies such as the laying on of hands, and blowing—practicing the latter upon the enemy, walking around his house. They send him also, by a third party, something to eat, with the intention of harming him: they succeed in this, although not by putting poison in the thing sent. They are superstitious in the extreme, having much attention to the phases of the moon, and according as the weather is good or bad for them, they burn candles—in definite numbers, known only to them—which they distribute between certain roadside crosses, where they light and leave them. In cases of great necessity, they bathe at midnight and then light, in front of the church or before their idols, the candles bought in the plaza. The most superstitious light these at the lower, usually broader end.

"When they have a hatred or prejudice, or see that some person is prosperous and wish him to die, they hold reunions in which they make vigil, carrying an empty coffin from the place nearest the church to the cemetery, praying meantime, in a low voice, as for the dead.

"It is a general belief in the pueblos of Caxonos and even in the City of Oaxaca among the lower people—and in many other cities of the

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Republic—that when they kill someone, if he falls mouth downward, the assassin cannot escape unless he drinks the blood of his victim, which they do. In various districts, but especially in Caxonos, they make triangular *tortillas* with a hole, about a finger's breadth in diameter, through the centre, which they give especially to babies: they make others of different shapes, among them some which are round and the size of a peso (dollar) or less: likewise others, called *memelas*, like belts a foot long and three or four finger-breadths wide. It is not certain that there are diviners in Caxonos, but the people there believe in them and go to Yalalag to consult them, paying them a price agreed upon beforehand.

"Southeast of Yalalag, at a distance of three-fourths of a league, is a cataract fifteen metres high, whither the people of the town resort for idolatrous practices. When rain fails they go there to bathe, with the belief that thus it will rain more promptly. They deposit at this place *tepache*—an intoxicating drink—*tamales*, fish, and other viands as offerings: in the same place they strangle fowls, sprinkling their blood to secure favorable response to their petitions. When they desire the death of some enemy, real or supposed, they strangle fowls, sprinkle the blood to the corners of the field, and then bury them either there or outside the house of the enemy. On the other hand, when they mean to favor someone, they practice the same ceremony but inside his house. All these things they do by counsel of the diviners whom they consult also to learn on what day or in what phase of the moon to perform them. There are at present in Yalalag three diviners, who are consulted by the natives of other towns as well and whose responses are sometimes verified.

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"It is asserted, further, that in that same town, there is, in a place known only to the idolaters, a house full of idols. Many of the townsfolk have confidence in two of the moon's phases—full and new—considering the new moon powerful and the full moon favorable to their requests: this too, whether these are requests favorable to friends and loved ones, or harmful to enemies. This same superstition exists in the other pueblos mentioned above, preference being given to the new moon for having masses and responses said and for carrying candles and flowers to the churches and crosses, believing that to be a good time, favorable for securing abundant crops and ridding one's-self of disease. Always when they go to practice idolatry in the caves or mountain cliffs they sally from their houses at midnight.

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"When anyone of that population dies they are accustomed to place with him a little *jicara* (gourd bowl) containing money and *tortillas*: if it be a woman they place also some *pixcles* or *mamey* seeds, in order that she may adorn herself and dress her hair before presenting herself to the divinity. The coins placed with the dead are to provide him with the necessities of the journey which he is believed to make and the *tortillas* are to secure passage from fierce dogs, which it is believed the dead encounter on the journey. In accordance with the advice of their diviners, they are also accustomed to bury some viands, *in order that the earth may eat also.*

"When there is some thorn in the body, or some swelling, they believe that some enemy has put earth, a pebble, or a bean into their flesh and they seek their *chupadores* (suckers) that they may extract the evil: these after sucking the spot affected show a bean, a pebble, or a bead, pretending that these things were therein. They are also strongly of belief that no one passes directly on dying to the beatific vision, but that all remain suffering in this world: the more devout betake themselves to the diviners, (who exploit them admirably, so long as they dare) until they ascertain, by their help, that the relatives have attained heaven.

"It is also stated that individuals of both sexes, belonging to the pueblo named, meet in three different places, to make sacrifice with fowls and dogs to idols, serving really as priests of idolatry.

"There are pueblos in which, when it thunders, the people gather together in the *patio* of the church, in order to cry out and they call the *Mayor*, that he bring the keys and lock up the thunderbolt in the jail; others are provided with machetes with which to strike the thunderbolt, which is as they say, *al contrario*, in chance it should desire to fall upon them. Recently, in the pueblos of Cotzocon and Candalloc there was a great fight on account of a lightning stroke. These two pueblos frequently threatened each other with lightning stroke, and a bolt having fallen on June 23 of the present year, St. John's Eve, in Cotzocon, three men were killed by it; consequently there was a serious fight with those of Candalloc.

"Among the Mixes they are accustomed to kill turkeys and sprinkle the blood around the planted fields that they may have good harvests; and when there is question of boundary line with a neighboring pueblo, they are accustomed to kill turkeys and to sprinkle the blood along the lines which they believe to be the boundaries. They buy pullets

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at a medio or a real and carrying them to the mountains, they sacrifice them in that manner to their gods. They place eggs of hen and turkey about the walls of the church and do not care to see who takes them, so that the cura always finds in this way a supply provided — and even he considers himself doing a charitable act in taking them, since, if the natives observe that the eggs remain long in the places where they put them they are greatly disquieted. It should be said that the cura loses no occasion for making them quit such practices.

"When women are about to give birth to a child, the husband spreads ashes on the ground not far from the house and constantly examines whether there is track of some animal thereon, since the Mixes believe that the babe will live while this animal lives.

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"When there is an earthquake or it rains much, the sexton enters the church with a lighted candle and all believe that nothing will happen, while he remains there.

"They are accustomed to ask that a mass be said in order that they may the more efficaciously harm their adversaries and it is difficult to make them understand that this is not proper.

"They celebrate the day of the assumption by visiting the pools of water in the mountains and they pray their gods to make known by the waters whether the year will be good or bad, finishing by begging that the year may be fruitful.

"In the pueblo of Betaza are many wizards and they make use, chiefly, of the form of the serpent to impress the people. They entice snakes into their houses and also make imitation snakes in wood: they make the people believe that they can, by their incantations, change the wooden snakes into living serpents at will. They carry fruit, eggs, turkeys, chickens, hens, bread and sweet cakes to the Lake of Yatie, which is on the road from the village to Villa Alta, in which lake they kill the fowls and throw them into the water with the idea of praying to father God for their families.

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"In the pueblo of Tepustepec, when the authorities assume office, they go to the mountains with fowls, eggs, and cornmeal, and drench the soil with the blood of these animals, the contents of the eggs and the meal; they select for this purpose the cascades, rapid currents, springs, caves and cliffs. On returning to the pueblo the most venerable of them throws cornmeal around the handle of the staff of office

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and upon the head of the *alcalde* that all may go well. The new *alcalde* then proceeds, well satisfied, to the church to pray. When they desire sons they go to a cave carrying *tamales;* in one of these, which they call *the principal*, they place pellets of corn dough, according to the sons they desire, and decorate it all with little rolls of the most tender pine roots (?) they can find.

"In the pueblo of Tamasalapa, where they are mostly carriers or merchants, before setting forth on a journey, they sprinkle the blood of a chicken in a cave where there is a spring, leaving the head of the fowl there but eating the rest of the body. If they see a serpent in the road they return at once to the pueblo, because they believe that it is a sure sign that things will go ill, and they defer their journey for a week. If there is no ill omen and they buy their *chilis* cheaply, they buy some *tepache*, and having spilled part of it upon the ground for the souls, they drink the rest. When they find themselves ill, they go also to see those they call *abogados*, that they may suck the sick spot. And these, as has been said above, make them believe that they draw out stones, spines wrapped in *ixtli*, and other things which they say enemies have placed there; and if the diseased are avaricious persons and do not care to reward them, they bring forth *mescal* and cigarettes, making them believe that all this was in the sick spot.

"On New Years and Christmas Eve, they go at night to a cave where there are two subangular stones, three-quarters of a yard high, a yard and a half in circumference at the base and a yard at the top. They say these are the patron saints, Peter and Paul, and they carry thither *tamales* and turkeys; they leave the head there and drench the ground around with the blood, as also with little vessels-full of *tepache*. In their sown fields they are accustomed to bury a chicken, which they go to examine every few days, and if the remains contain many worms, it shows that there will be a good year.

"In Chichicastepec they bury, behind the church and among the cliffs, tender young dogs, eggs, cornmeal, and, in a leaf, blood and three feathers of a chicken.

"The present parish priest at Ayutla took away an idol from the people of that town: they kept it hidden in a cave and burned candles and sacrificed animals to it.

"In the parish of Atitlan, beyond that which we have already said of the thunder-bolt, they have the custom of killing a snake and after

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burying it they surround it with hens' eggs and then they repeat the following — *ya te di tu presente, no me hagas nada, y haz que se me dé mi cosecha.* (There I have given you your gift: do me no harm and cause that my crop shall come.)

"Also they generally believe, when children are born, that they have their *Yona*, and they learn from the *abogado* about this animal or *tona*, which each child has, taking great interest in knowing it, because they believe that, if this animal dies, the child will die at the same time.

"When hunters kill a deer, they place its head upon a certain stone and they never give away this trophy nor sell it, no matter for what price, since they believe that from then good luck would abandon them.

"When there are quarrels and contentions between a husband and wife, they go to ask an *abogado* how the matter is explicable. And he tells them because their names are much alike — for example *Tastahen* for the woman and *Xaxahen* for the man. They assert that, as the names are so similar, there is no remedy and that they ought never to have married each other; with which response, the couple keep on quarreling.

"In Lachirioag, they put food on the grave of their dead when they order a mass said, and a little below the site of the chapel, among some cliffs which are near by, they also place eatables; they believe this latter spot to be purgatory.

"In Tonaguia, dependency of Totontepec, they buy large chickens at sowing time and cutting their throats at the borders of the fields already sown, they sprinkle these with the blood."

These quotations are not all regarding Mixes: some of the towns here named are Zapotec, but all are in the same region.

The Mixes delight in rather elaborate celebration of their *fiestas*. They have a variety of dances and dramatic performances: these have been much influenced by Spanish ideas. They retain, however, some hints of Indian life in the costumes and musical instruments. Thus the old rattle, made of the hard and round fruit of a tree, is still retained. Curious wands of feathers or down used in the *Danza de la Conquista* seem to reproduce some aboriginal object. At San Juan Guichocobi they have long used the *mai-yä:* a good specimen of this from that place is now in possession of Bishop Mora of Tehuantepec. (Fig. 47.) It consists of a two-bodied brownish-black earthen vessel,

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the round bodies being one above the other; over the aperture at the top of the upper body is tied an iguana skin: a neck and head of some animal or bird project from the lower body and a hole in the back of the head serves for air escape. The sound given by this pot drum when beaten is clear and fine. The specimen measures 1 ft. 3 in. in height and 9 in. in diameter.

The old writers refer to cannibalism as a practice among the Mixes. We made inquiry in this matter and received many reports that it has existed until quite recently. Father José Maria Hernandez, Cura in 1896 at Juquila, insists that the practice was not uncommon at Chichicastepec, Mixistlan and Jacotch no more than sixty years before; he claims that travelers stopping in these towns over night were invited to rest in the *temascal* as the nights were cold; after the *temascal* was heated, and the stranger had entered, red peppers were thrown in and the entrance closed: the fumes were to choke the victim, who would afterward be cooked and eaten. An old Zapotec who had lived in Juquila for forty years, in 1896, and whose statements I have usually found trustworthy, says he has never known cannibalism in Juquila or the neighboring towns but that it *has* occurred in Mixistlan within his knowledge. He also mentioned Chichicastepec and Jacotch but considered them as less addicted to the practice than Mixistlan.

The Juaves.

Orozco y Berra presents a summary of what had been written about this very curious and interesting people before his time. We know of nothing since. Some gentlemen at Tehuantepec and Juchitan have made some study of them but have not published their observations. Writers usually claim, following the traditions of the people themselves, that they have come from the south—either Peru or Central America. They have to-day but four villages, San Mateo del Mar, Santa Maria del Mar, San Francisco del Mar, and San Dionisio Del Mar. Ixhuatan, mentioned by Orozco, has long been abandoned. We can say nothing of the language but present a brief vocabulary. The people are conservative and are rarely visited by white men. Their towns lie at the edges of, or near, long and narrow, shallow lagoons of salt water reaching inland from the Pacific Ocean. The soil is sandy and not adapted to agriculture: some banana trees and cocoa palms seem to be the only cultivated plants. They have, however,—as they had generations ago—quantities of stock, cows and horses. There are many

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wild rabbits. Still the people rarely eat meat, refraining from it, apparently from some superstitious motive, except on certain *fiestas*. The usual food consists of fish, eggs, and *tortillas* made with purchased maize.

San Mateo del Mar is perhaps the largest of the villges and is said to be the most conservative.* Our work was done there. The town lies on a nearly flat sand stretch: the plaza is an vaguely defined space with the municipal house on one side and the church on another. The walls of the houses are of cane set upright and of palm. (*Inds. So. Mex.*, Pl. CX, CXI.) Several buildings are usually grouped together, one of them being an open rectangular shelter. A wall of canes surrounds the whole group, giving privacy and protection against wind-blown sand. The Juaves have the general reputation of naked tribes. Those met along the road, in yards or houses, or down by the lagoon were but scantily clad. Boys go naked until ten or twelve years of age. Older boys and men commonly wear only a breech-clout and a head cloth. When they enter the plaza, however, they are required to wear further clothing and generally then wear hats At home and about town outside the plaza women wear no *huipil*, but are naked from waist up. (*Inds. So. Mex.*, Pl. CXVI, CXVII.) The time is not long past when the Juave men used to go into Tehuantepec with only the breech-clout and women without the *huipil*. The teacher at San Mateo says that formerly the men shaved the forward part of the head. Two or three men of the village weave capital woolen jackets of brown or blackish colors, which may be worn in the evenings. It must be remembered that the temperature in these little sea-level towns is high and a sufficient excuse for scanty clothing. The *huipilis* worn by the women are rather neatly made: they are woven of home-spun cotton; from one to five vertical stripes of color divide the garment into spaces the central one of which is used for further decoration consisting of transverse (horizontal) lines of animal figures, geometrical designs, running lines, etc. These figures are curiously ill-defined and are usually made in pale purple (violet) or white. (Fig. 49.) The purple (violet) is a favorite color and is called *caracol* (snail). The dye is made among the Chontals (which see). Both men and women wear belts. Those of the men are red with narrow blue lines marking

* For much regarding the Juaves we are indebted to Dr. Castle, a practising English physician, living at Tehuantepec. Dr. Castle is interested in the natural history of the Isthmus, upon which he is good authority. He is one of the few white men who visit Juave villages.

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them off into checks: the coarser white belts of the women are crossed at intervals by a set of three narrow black lines. *Servillettas* (napkins) of white cotton, for carrying hot *tortillas* may be decorated with inwoven figures of birds and geometrical patterns (Fig. 50) or embroidered with bolder designs (Fig. 51). The spindles and whorls used here are the same as those of the high Mixteca and Triqui country.

As they walk, or sit talking, men are always busy at their nets. These are made of cotton cord. The twisting spindle used in making this stout cord out of slender thread is of hardwood with a rather large but thin disk of wood cemented to it. The tip of the spindle is notched around and one end of the the cord made fast to it: there are notches about the edge of the whorl. The ball of yarn is carried and paid out between the fingers. The spindle is picked up with one hand and set whirling against the leg and thrown into the air. The tip and notches hold some thread firmly and the movement twists it into cord. When done, this is wound on the spindle, a new length is caught up, and the work proceeds. (Fig. 52.) In netting, a spool is used consisting of a slender shaft of wood with two conical pointed ends: the cord to be used is wound on this: a second stick holds the section of the edge of the net, at which stitching is progressing; the finished part of the net is attached to a little block of wood which serves as a toggle. (Fig. 53.) When they walk or converse the part of the net that is finished is wrapped about the waist and caught securely with this toggle. (*Inds. So. Mex.*, Pl. CXII, CXVIb, also Fig. 53.) Two kinds of nets are made, conical cast nets and seines. Cast nets are widely used in Mexico—e.g. at the barranca near Guadalajara, at Tehuantepec, among the Juaves, among the Totanacos in Puebla, and elsewhere. Though constantly fishing and canoeing the Juaves are bad watermen. Few of them swim; the canoes they make are ugly and clumsy dug-outs made from great logs. They are slope pointed in front and almost squared or slope squared at the other end: they are flat bottomed and are rather neatly hollowed out; the walls are quite thin and are more widely separated midway of their height than at the bottom or upper edge. Some have three pairs of loops at intervals along the upper edge for clumsy oars, but the usual mode of propulsion is poling. The fishermen usually carry a spear, with a pole shaft and a long, square-sectioned, iron point. This is used chiefly in keeping alligators from attack.

The Juaves catch many fish and enormous quantities of shrimps.

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They also make or gather salt at drying lagoons. These products permit a commerce. Zapotecs from San Blas, and Tehuantepec, but especially from Juchitan, make regular visits to the pueblos bringing maize, *zacate*, chocolate, bread, *chicos zapotes*, raw cotton, etc. One old woman, traveling in her ox-cart with her family, at night, makes two trips here weekly. Her stock is exchanged for fish, shrimps and eggs. These she carries to Juchitan, sells them, and fits herself out anew for San Mateo. In her transactions she sells by weight. Her scales consist of a pair of tin pans balanced on a beam. Her one weight—presumably a pound—is a neat round stone. She always weighs one pound of the material to sell, then she divides this between the pans till balanced, then divides these half pounds in the same way and so on to the desired quantity. Little coin passes in this commerce; it is chiefly barter.

There are many alligators and crocodiles in the lagoons; some of these are different from others in color, gray with greenish spottings; such are rarely disturbed and are considered *naguales*. This means that they are spiritually related to some human being and it is believed if one is killed that the person related to him will be found dead. The school teacher (1899) says these *nagual* alligators must really be *cristianos* (christians, i. e. human beings) as is proved by the fact that an alligator was once killed and a ring of gold was found upon one of his toes; the same night an old woman died. All alligators are treated well by Juave fishermen who, whenever they make a catch of fish, throw some of the fish back into the water as a gift for the reptiles. Once a man, who must have fallen out of his canoe and drowned, was found much decomposed floating in the lagoon; the top of his head had been eaten by alligators. It is commonly believed that this happened to him as a punishment for forgetting sometime to give them fish. Dr. Castle says that the red cloth about the head of old men signifies that they have given a certain number of public feasts. When the townspeople think a man is getting pretty far ahead in worldly goods they compel him to give a public feast which practically reduces him to poverty; if he gets into condition to repeat this he becomes a "principal" and assumes the red head-cloth. I suspect that there is confusion here and that the feasts are officially given and that the cloth, if significant, signifies the having held office. The Zapotecs and the *mestizos* of the district insist that there is a sacred cave, on an island, not far from the shore near San Dionisio and many stories are told of

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unsuccessful attempts by outsiders to see it.—At Coixtlahuaca I met a Dominican who in the sixties was priest to the Juaves of San Mateo and in 1870 was sometimes at San Francisco. At that time at San Mateo they used two native musical instruments in a certain celebration. One of these was made of a turtle shell; the other, which is called *sam-po-ña* is a musical bow, made of the "spine" of a fish bent with a cord: one end is placed in the mouth while the other is held in the hand: it is played with another "spine." The celebration in which this was used is a pantomine. The peformers first form a circle and salute each other: they are called to sudden attention, a discussion ensues, a search or investigation follows, etc.

The Chontals.

An unfortunate confusion exists regarding these people. Orozco y Berra is partly to blame for it; Brinton has increased the confusion by an attempt to remove it. Orozco's error is in calling some of the more important Chontal towns Triqui: he also gives a list of real Chontal towns, but at the same time introduces at least one Zapotec town into his list—Tlacolulita. The Oaxaca Chontals live in the District of Tehuantepec. Brinton claims that Chontal is a misnomer: that it is the word meaning stranger, and not a tribal name; that it is equally applicable to many different tribes. That the word is Aztec, meaning stranger, is true: that the word is applicable to various tribes *may* be true, though not yet proved. That the name is regularly and consistently applied to the towns of Oaxaca above indicated is certain; that the people living in these towns call themselves Chontals, and speak one and the same language, which they call Chontal, is also certain. What reason, then, for doing away with the name and introducing a new term, Tequixtlatecan? Tequixistlan has a rather imposing rectangular *plaza* with a large well-built town house at the upper end and a large church at the lower end; along the two sides are schools, *ticndas*, etc., the latter being the property of *mestizos* of whom a considerable number live here. The houses (*Inds. So. Mex.*, Pl. CXXV, CXXVI) are much like the hot land Zapotec houses and call for little notice. There seems to be no characteristic dress—the women being clad much like those of the Tehuantepec district or like *mestizo* women generally. Their hair is neatly done up. It has a mid-part from in front down to the very base of growth and is braided into two braids. These are wound up onto the head where the tips

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are tied together. Fishing in the river here has some importance. The Chontals are the makers of the purple (violet) dye already referred to (p. 148). Huamelula is the centre of the industry. The coloring matter is secreted by a sea slug—probably an *aplysia*—at a certain time of the year. At that time the people go to the coast and get the animal from tide-pools: a gentle pinch or blowing with the breath causes the flow of a milky fluid which is applied directly to the cotton yarn, staining it. The color of the yarn varies from a rather dark reddish purple to a violet, according to quantity of the staining fluid applied and the age of the goods. The yarn is sold and the weaving is done elsewhere—chiefly at Tehuantepec.

The Cuicatecs.

The pretty town of Cuicatlan, situated on the Mexican Southern Railroad between Puebla and Oaxaca, in the State of Oaxaca, is the capital of the district of the same name. Three tribes live in the District—the Cuicatecs, Mazatecs (in part) and Chinantecs (in part). The Cuicatecs at Papalo, where we examined them, are disagreeable and uninteresting Indians. They do not present a definite physical uniformity. The language is related to the Zapotec. Few women wear notable dress: *camisas* may have open-work decoration or pleating at the sleeves or narrow bands with inwrought designs in pale blue or black.——*Servillettas* or tableclothes of cotton are frequently embroidered with designs. (Fig. 54.)

The Chinantecs.

Little or nothing has been added by later Mexican writers to what Orozco y Berra states of the Chinantecs. He held that the language was unrelated to its neighbors and of uncertain affinity. Pimentel was inclined to locate it in the Mixteca-Zapoteca family. Both quote Burgoa who says:—"The utterance is through the closed teeth (*entre-dientes*) violent and with harsh consonantal, and compressed vowel sounds—not clearly distinguished, which appear like cries of animals rather than articulate speech." Barreda printed a *Christian Doctrine* in the language and Orozco thinks he was also author of an *Arte*. We have two ancient ms. vocabularies and a ms. book of sermons in our possession. The present speech appears to deserve much of Burgoa's criticism. There are several well marked dialects: that of San

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Pedro is represented in our *Appendix*. The towns of the Chinantecs are in the Districts of Cuicatlan and Villa Alta in the State of Oaxaca. Garcia y Cubas in 1876 claimed 12,000 population. The physical type is admirably defined.

The Chinantla, in scenery, is one of the most beautiful parts of mountainous Mexico. The great mountains, clad usually with magnificent forests, the trees of which are loaded with bromelias, orchids, and other aerial or parasitic plants, and the vast valleys are wonderfully bold and varied. The climate, however, is disagreeable; there is practically no dry season, and chilly and drenching rains, dismal fogs and settling clouds frequently shut out the attractive scenery. Doubtless these disagreeable climatic conditions are largely to blame for the drunkenness which prevails in such towns as we have seen. The roads are naturally poor on account of the frequent rain. Streams subject to being swollen by downpours are often crossed by neatly made *hamacas*, or vine bridges. (*Sup.* Pl. II, and cf. *Inds. So. Mex.*, Pl. XCVIb.)

Houses vary considerably. At San Juan Zautla the walls may be built of stone (schist) laid in mud, of adobes, or of wooden slabs set upright. All are palm thatched and each usually has a little patch of bananas or other trees close by. At San Pedro Soochiapam they are well built, of large size and quite compactly grouped. Some have walls of stone and mud, but most are constructed of poles or narrow slabs set vertically and neatly corded together. The roofs are finely made palm thatches; the two greater surfaces are sharply sloped, the smaller end surfaces as much so. The two greater slopes do not, however, come to a sharp ridge line; the top of the roof is flat and the thatch is laid lengthwise: bunches of thatch material are laid across this or pegged down to hold it in place. Much cotton is used in San Juan and San Pedro. The raw cotton is brought from Usila and is beaten before it is spun. A great cushion or pillow is made of moss in a matting sack: over this is stretched and fastened a deerskin: upon this the cotton is laid and beaten with *ma-pa-ho*. These are composed of several sticks bound together so that at one end they can be easily held in the hand, while at the other they diverge. They are used in pairs, one in each hand and are vigorously plied alternately. The noise of the beating can be heard to a great distance. The result of their use is that the cotton is made into a smooth and even sheet which is then spun and afterward woven in the usual way. (*Sup.* Pls. IV, V; also Fig. 57.) The Chinantec men wear a characteristic red

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cloth about the neck or head; sometimes a knot will be tied in one corner and this will be placed upon the head while the cloth falls down over the ears and back of the head upon the shoulders. These are woven here of cotton thread bought at Usila or Oaxaca ready dyed. They may be divided into rectangular areas by woven cross lines of yellow or black. At the corners and in a little group at the center are usually small designs worked in green, yellow, or purple wool; these are usually geometrical designs or stiff and conventional birds and animals. (Fig. 55.) The belts worn by men are of local manufacture. They are white with transverse decorative bands of red; or of red stuff with transverse lines or bands of open work or stitched patterns in wools. The *huipil* of the woman is of white cotton woven with stripes across in open work: it is decorated with bands of geometrical designs in colored wool and single figures or lines of figures in colored wool. The borders of the neck slit are decorated with needle work. (Fig. 56.) Both in the *huipil* and the men's head cloth the colored wool designs are worked in during the weaving with short lengths of wools, not embroidered later. *Servillettas* or *tortilla* cloths are woven in white cotton, with transverse bands of geometrical designs in raised wool — white or colored.

The hair-dressing of Chinantec women is eminently characteristic. The hair is mid-parted and done into two thick round braids: these are wrapped around and around with black cloth strips until they hang stiff and heavy, like large ropes down the back.

The domain of San Pedro is not great: it extends in the direction of San Juan about a half league and perhaps an equal distance in the other direction. The *Secretario* says the land that can be cultivated in any one year is only one-fifth the whole, so any given piece comes under cultivation but once in five years. The season for preparing and planting is April and May. The ground is cleared with hatchet hoes and permitted to lie two weeks: it is then turned over. In planting the holes are made with a pointed pole or rod of wood and five grains are dropped into each. The holes are made at about four feet intervals. Maize and beans are the only crops. Maize takes five months to ripen. Special fields are set apart the produce of which belongs to the *Municipio* or town government: in case this product surpasses a set maximum quantity, the surplus is divided among the laborers — (i. e., all the village). This municipal stock of grain is carefully stored and is sold at the regular price; from this sale the

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incidental expenses of the government are paid.——A considerable trade goes on from village to village. Usila has already been named as the source of cotton; Papalo (Cuicatec town) supplies the *ocotes* or fat pine splints for torches. Considerable bark of *jocote* is gathered. This is taken off in long strips and done up in bundles. It is used as string or rope. The bark contains a juice which can be worked up in water so as to yield a suds which is a refreshing wash for the head; it is also used as a plaster in dressing wounds and in staying blood. ——The intoxicant used here is of local manufacture and is called *chingare de caña* or *ma-tchi*. It is distilled from the sap of sugar cane. A large *olla* filled with *tepache* (fermented juice) is set over a fire and heated; above it is another vessel which receives the vapor and in which it is condensed by being chilled against the bottom of a vessel fitted above this: this upper vessel is of metal and is cooled by running water conveyed to it by a long tube and spout. The resulting drink is a somewhat clear, whitish, liquor of no great strength. Enormous quantities are drunk.

The *Secretario*, who was by far the most intelligent man at San Pedro, claims that they have no sacred caves and make no sacrifices in the fields. There are *brujas* (witches) and superstitious treatment of disease. An aunt — with whom he has quarreled because she failed to cure his daughter — knows the language of serpents, which is the source of her skill in medicine.——When he was *Presidente* once, he was making the nightly guard watch and saw a *bulto* (package, object), which he inferred to be a witch. The object disappeared, apparently by transformation, and in its place was a young bullock. Sure now that his suspicion was justified he shot the creature. Not long after a woman, generally suspected of being a witch, died.

The Chochos.

The name Chocho is said by Orozco to be applied to a language in Oaxaca, while to the same language in Puebla is given the name *popoloco;* it is also the *tlapaneco* of Guerrero, the *teco* of Michoacan, the *pupuluca* of Guatemala, and the ancient *Yope*. He considered the populations speaking these fragments of one of the oldest populations in the country. In the district we visited there is clear recognition that the language of the Chocho towns of Oaxaca is the same as the *popoloco* of Puebla but there appears to be usage of applying the term chocho to the people, the word popoloco to the language. Often

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Chochos of Nativitas, Concepcion, and Coixtlahuaca, when asked what language they spoke, replied popoloco. The Chocho is considered related to the Mixtec and belongs to the Mixteca-Zapoteca family. Belmar has just prepared a valuable study of it. The Chocho towns are located in the District of Coixtlahuaca. The *cabecera* is a little town of well-built houses surrounding a great plaza: an interesting old church, on one side of this, faces the municipal and district buildings on the other. The population of the centre of the town is *mestizo*, but the outlying parts are purely Indian. These Indians have many of them forgotten their own dialect and speak only Spanish. They present little of ethnographic interest to the hurried traveler. Even women wear nothing characteristic in the way of dress, being clad in cottons and prints made on civilized looms, bought from the shops, and wearing *rebosos:* rarely one is seen with a pleated black woolen *enagua* and with a blanket of grey unbleached stuff instead of a *reboso*. Babies are carried here in front, in the arms, tucked out of sight in the *reboso* ends. Things are no better in the outlying pueblos. For example at Concepcion Buena Vista, it is said that fewer speak the *idioma* than at Coixtlahuaca and that the younger people frequently do not understand it: there also all go clad as *mestizos*.

Houses are rather characteristic (*Sup.*, Pl. XI): usually two occur together in one enclosure with from one to three or four little outhouses of various kinds. Some houses have neatly laid stone walls; in some these are quite covered over with plaster; in many the wall consists below of a line of stone slabs set up on edge, upon which is raised a wall of split poles set upright. In constructing these, posts are set at intervals for supports: the vertical split poles are held in place by lashing to horizontal poles: the lashing strips of bark are so managed that they appear as vertically crossing the horizontal poles. The framework for the thatching is closely and elaborately constructed of poles. The thatch of palm comes down far below the top of the walls and projects well beyond them; the end of the palm stalks of the upper lines of thatch project to form a serrate ridge. (Cf. Mixtec Tilantongo.) This may be bound over with *pencas* of maguey or the whole roof may be covered with these. The roofs are four-pitched and very steep and often come nearly to the ground; in such cases the thatch is cut away over the door to permit passage. The doorsill may be a stone slab set on edge or there may be a stone set flat as a step in front of a sill, consisting of a board or stone slab set on edge. In

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houses with walls of stone, these are carefully mud plastered on the inside and often painted or otherwise decorated. A curious feature of Coixtlahuaca (and presumably elsewhere) is a "cave" at the side of the house: a neat square hole with steps cut in the soft tufa rock leads down into a little cavern just large enough for a couple of persons to seat themselves in. A little cross is scratched in the wall. In these caves the man and woman of the house sit to weave palm hats. The humidity of the cave prevents the rapid drying of the palm and thus facilitates the work. The braiding of palm is the chief industry of this people. Men work at sombrero making as they walk along the roads; prisoners in the jail, officials at the town house—all weave hats. They sell at four pesos a dozen. The *Jefe politico* of the district asserts that the trade in the plaza amounts to 8,000 pesos monthly most of which is in *sombreros*. One of the Chocho towns near Coixtlahuaca is called "Tequixtepec of *sombreros*." Palm is also woven into *tenates:* these are usually plain, but those of Ixcatlan (a Chocho town, though of the District of Teotitlan,) are woven with colored designs upon the natural background. From shredded palm men twine ropes and lassos and they are often seen weaving at these as they walk along the roads.

On Chocho roads many cairns are heaped up by the passers. Between Cuicatlan and Coixtlahuaca, in a day's journey we probably passed seven or eight. The largest and most striking of these was heaped up at the base of the trunk of a fine shade-giving tree. The Chochos place these stones as they go to Cuicatlan for they believe if they fail to do so that they will never return. They also say that the stones are placed by weary travelers to quit themselves of weariness. In two cases near Cuicatlan the cairns were in pairs with a little distance, some yards or rods, between: midway between these was a little cross at which flowers and leafy branches are laid as offerings. In neither case were the cairns of these pairs of equal size and in both cases the larger cairn had grown up around a notably curiously shaped natural rock. Near Huauhtla, on the very crest, before reaching it on the out journey, we found a cairn with a little cross surmounting it, where our *mozo* claimed the Chochos dance as they pass, to secure safe return. Almoloyos (probably Mixtec) has a bad reputation for witches. It is also said that there they have the habit when gathering sap for *mescal* to spill some on the ground: otherwise the plants will cease to yield sap.

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The towns throughout this district bear Aztec or Spanish names. Some of the Chocho names are, however, still remembered or used. Tequixtepec is Ná-nĭn-gī—the hill of caves; Tepetlapan is Ā-tūng-dā-rhā—upon the rock near the river; Yucundacua is tūng-ñā—behind the mountain; Ixcatlan is sū'-da; Concepcion is shā-rĕ-shā-shī—the pueblo of the Virgin; Tepelmeme is ñā-sē—yellow mountain; San Antonio Abad is gī-sī-nā—plain at the foot of the mountain; Tulancingo is nīngā-sīngō (apparently a compound of Chocho and Aztec); Coixtlahuaca is gīng-tcĕ—plain of serpents. The meanings usually are the same as those of the Aztec names.

The following table gives Orozco's list of Chocho towns, the names being given both in Aztec and Spanish where there are two names, and the population as officially reported to me in 1900:

	MALE.	FEMALE.	TOTAL.
Texquixtepec: San Miguel	708	640	1348
Tepetlapan: Santiago	206	210	416
Capulapan: Santa Cruz	70	74	144
Suchixtlahuaca: San Cristobal	539	453	992
Otla: San Geronimo	200	178	378
Nativitas: Santa Maria	1061	1059	2120
Yucundacua: Santa Catarina: (?) Nodón	114	114	228
Ixcatlan: Santa Maria. (In Dist. of Teotitlan)			
Buena Vista: Concepción	363	345	708
Aztatla: San Miguel	180	231	411
Ihuatlan: Plumas.* Santiago.	389	341	730
Tlacotepec: Plumas.* La Natividad.	601	601	1202
Tepelmeme: Santo Domingo	961	1046	2007
Tlapiltepec: San Mateo	590	531	1121
Jicotlan: Magdalena	328	321	649
San Antonio Abad	173	201	374
Tiopan: San Francisco	258	261	519
Tulancingo: San Miguel	643	633	1276
Coixtlahuaca: San Juan	1557	1546	3103

The Mazatecs.

Orozco y Berra left the Mazateco unclassified: Pimentel gave examples of the Lord's Prayer in two dialects and seemed inclined to refer the language to the Mixteca–Zapoteca Family. Later writers

* Plumas is divided by a street into two parts—Ihuatlan and Tlacotepec.

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have followed him. Belmar in 1892 published his *Ligero Estudio sobre la Lengua Mazateca* — a really important work. The towns of the Mazatecs are in fine mountain regions in the District of Cuicatlan and Teotitlan. Our work was done at Huauhtla in the District of Teotitlan, a *municipio* which claims 7,000 population, almost purely Indian. It lies at the crest of a magnificent slope, which is checkered with the fields of the population, almost to its base (*Sup.*, Pl. XV, XVI). Until recently this town was in the highest degree conservative but within a few years astonishing changes have taken place. Its municipal house is one of the largest and best built in Indian Mexico.

The population of Huauhtla is purely commercial: they are vendors in their plaza which on Sundays is crowded with people from other Mazatec pueblos. Until recently, though going to Teotitlan to market, they were too proud to carry the stuff they had for sale. Mrs. Debutrie tried to secure a cook among them: the woman was well satisfied with the work and pay offered except that it would be necessary for her to carry water and she feared she might be seen. Mr. Debutrie bought some shelves from a man of the town. They were dirty and he suggested that they should be cleaned before delivery. The man agreed saying that he would send for a San Lucas man to clean them. The people of the other pueblos near by are industrious but beyond all are those of San Lucas: "there are no other such workers." The San Lucas men are workers in wood also and make chairs, tables, boxes, beds or other things to order. They spend, however, all their earnings here for drink. On the whole the Mazatecs are a light-hearted people fond of music and gayety. The band at Huauhtla is the largest we have seen in an Indian town; they are kept practicing from daylight until late at night: the performers are boys and some of them must give way under the constant labor. There are many songs in the native language which are often accompanied by the accordeon. This instrument is a favorite and the people say it speaks — and that the language is Mazateco. The women at Huauhtla showed characteristic pride: when reporting for measurement all dressed in their finest *enaguas* and *huipilis* and ornaments: they were vexed, almost to spitefulness, if their portraits were not made. There are some cases in the town that appear to be purple *pinto:* and Mr. Debutrie says that at Chichotla there are many. *Pinto* is a disease common in many parts of Mexico. It is a discoloration of patches of the skin. There are three varieties, red, white and

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purple. It is fearfully common in Guerrero and Chiapas and locally in some other states. It is a permanent disease and not painful except at a certain stage of the *red*. A curious flatness of the head in the occipital region is common here: it looks as if artificially produced but we did not succeed in satisfactorily deciding the question.

The dress of the Mazatecs is characteristic. Men wear dark blue or black *cotones* or slit *serapes* of wool as an overgarment: under these they wear white cotton *cotones* with vertical stripes of black or blue. (*Sup.*, Pl. XXI.) Some wear silk *cenidors* or girdles. These are of home-raised, home-spun, home-woven silk and are often of brilliant color: sometimes the initials of the owner are worked in silk near the end. The fashion now is to weave the silk girdles of bright hues in longitudinal stripes: formerly the colors were less brilliant and the striping was transverse. The women are gorgeous with their gay apparel. In some pueblos and on common occasions the *enagua* may consist of two strips of cloth, the upper white, the lower an ugly brown. But at Huauhtla usually, the *enaguas* are of white home-woven cotton with a wide band of brilliant (cochineal) embroidery in heavy geometrical designs: above this are embroidered horses, dogs, human figures, rosettes, etc. The color is, unfortunately, *not* fast and the garments are generally badly stained (two examples; Fig. 60). The *huipilis* are of fine home-woven cotton with more or less open work texture and are woven with large elaborate designs in rose red or dull blue. The simpler types bear eagles, a pair of birds perched facing, conventional designs resembling crabs, lobsters, etc. At times these will quite cover the breast or body of the garment. In many highly prized *huipilis* the patterns are in spaces marked off by sewing on bright ribbons, blue, crimson, or purple in color. These are applied single, double, or triple: they may be placed so as not to interfere with the embroidered decorations or may cut across them in any way. (Figs. 58, 59.) Women wear large ear-rings, usually of silver: a favorite pattern is a series of three crescents of different sizes with the tips coming together, but with each size hanging within the larger ones: they also wear many beads of which the favorite seem to be round red corals. The hair is carefully braided in two broad, flat, long braids which hang down the back: they are continued by inbraided coarse cords of black woolen yarn. (*Sup.*, Pl. XXII, XXIII.) In carrying burdens on the road the Mazatecs have a little rectangular open work basket made of twigs which they bear upon their shoulders.

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The Mazatec houses are strikingly unlike those of the preceding tribes. (*Sup.*, Pl. XVII, XVIII.) The walls may be built of *adobes* or the lower part may be of *adobes* while the upper portion is of narrow boards set vertically and lashed to horizontal poles, or they may be of poles set closely, vertically, and lashed in place. It is however the thatched roof which is characteristic. The frame work, as usual, is of poles and bamboos lashed into position; an outside ridge pole lies upon the crest of thatch and projects well beyond the upper point of the smaller, end, slopes of thatch; these ends themselves support masses of thatch which project beyond the ends of the roof proper in the most curious way. Bunches of thatching material are bound astride the crest pole and pegged down. The houses are usually grouped in little level areas cut out from the slope. Two or three houses and an equal number of outhouses are often in one of these groups. The commonest outhouses are picturesque little granaries, with the same style of roof as the houses, set well up off the ground on posts. In some house groups there are thatched roofs of the usual kind set up on post supports and serving as shelters open to the air.

Mention has already been made of the silk culture. This is considerably pursued. The worms are cared for, the silk is reeled, dyed and woven. It is not lustrous as our own silk fabrics and rather coarse. Besides the girdles already mentioned it is woven into carry-cloths or kerchiefs. There are some curious beliefs connected with rearing silk worms. Those who handle them must not eat garlic or onions, nor handle tomatoes nor *chilis* nor the clothing about a corpse or the silk worms will die. Should the handling of any of these things be absolutely necessary careful washing of the hands is enjoined ere having aught to do with the worms.——Huauhtla is proud of its *mapa* and *titulo*, both of which are carefully preserved. The latter is a quarto document, with a parchment cover and bearing date of 1763. The people believe the *mapa* to be about equally old. It is painted on a strip of coarse cotton, probably native woven, in red, black, yellow, and brown, and measures about seven feet by three feet ten inches. It represents a mountain district: various astonishing birds and animals are represented upon this landscape and considerable detail of geographical localities — roads, streams, mountains, caverns and villages.* On the whole the workmanship is not bad.

*The author has it in contemplation to reproduce his photograph of this curious geographical chart. Copies will be furnished at a nominal price.

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Pīsiětē is a green powder of the leaves of a plant. It is universally carried, in little calabashes or gourds which are fastened in the girdle or attached to some part of the clothing. It is used by people on the road to take away fatigue and also in *brujeria* — witchcraft. In *brujeria* it is used (a) to protect against witchcraft, (b) to cause witchcraft — thwarting others in their enterprises, causing illness or misfortune, etc. It is used in *brujeria* before the sun rises: a pinch is placed between the lower lip and the canine teeth on either side, a sip of wine is taken and formulæ are repeated. It was only with difficulty that some of this powder was secured and information as to its use. It was impossible to gain the formula.——When corn begins to form in the fields the services of a *curandero* must be secured. He is supplied with two turkeys or a sheep. He kills the victim or victims at the edge of the field and then walks around it, with proper formulæ, scattering blood from the headless trunk. This not only helps the crop but protects against robbers. In case anyone attempts to rob such a field, he will break out with dreadful sores. To bewitch an enemy carry three feathers from the wings or tail of a *guacomayo* (macaw) to a sorcerer, together with three cacao beans and an egg: he goes, before sunrise, to bury them upon the property of the victim. ——A French gentleman named Debutrie lives in Huauhtla where he keeps a *tienda*; he also owns a coffee plantation a few leagues from there at Chichotla. He has been among the Mazatecs some seven years. He gave me the following information. He says it is matter of current belief that the people of Chichotla keep a great serpent in their church; that they leave *tortillas*, eggs, chickens, etc., for it and believe that its killing would bring dire misfortune on the village. Inhabitants of neighboring pueblos call this snake the god of the Chichotla people.——It is prevalent belief among Mazatecs that men can transform themselves into animals, especially "tigers," and the people of Chichotla are especially ill-reputed in this respect. When a tiger is killed some one, usually an old woman, dies, and this was the person who was formerly a tiger. Not long ago a tiger was killed on the plantation of a Scotchman named Forsyth; in the morning an old woman was found there dead.——There are no old people at Chichotla, who were born there. All have moved in from San Lucas, Huauhtla, San Geronimo or other places. Nor did the dead parents of the younger people *belong* there. When questioned why there are no real Chichotla people — for there is ample evidence that the site

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of the town has been long occupied — they declare that all the real Chichotla people have turned into tigers.——The Indians like to own black dogs, for they believe that, after death, they must cross a wide and deep river and in doing this they must seize and hold the tail of a black dog.——Cacao beans are much used in ceremonies. When a house is newly built a hole is dug below the place for the fire-place and cacao beans, eggs and small chickens may be there buried to secure good fortune.——After a baby is born, the god-parents may not wash their hands until after the christening in the church: then a feast takes place and the god-mother, sitting under the table, washes her own hands and those of her husband, who is seated at the table. Before a marriage the god-mother of the groom must wash him as if he were a baby; the god-mother of the bride does the same service for her.——At Huauhtla it is not customary to bury anything with the dead, except their finest clothing. At Chichotla the body of the dead is wrapped up in a rush mat, in a crouching position, and carried at a run, with blazing *ocotes* accompanying, to some place near the roadside, or preferably to a stream, where it is buried.

The Aztecs and Otomis of Hidalgo and the District of Huachinango, Puebla.

In Oaxaca the tribes occur as solid masses. The towns of the Chinantla are Chinantec towns; the whole district of Coixtlahuaca is Chocho; the little towns of the Juaves are near each other and taken together, mark out a small area, the speech and blood of which are purely Juave. There are, however, areas of Mexico where conditions are vastly different. Where the states of Hidalgo, Puebla and Vera Cruz come together we find the strangest interminglings. There Aztecs, Otomis, Tepehuas and Totonacs are surprisingly sprinkled. Where two insignificant little streams unite we may find the population between them of one speech, and those on each side of different languages. One town may speak one tongue, the next another; nay, even worse in a single village, two languages, two sets of costume and customs, two populations of different blood may exist side by side. Pahuatlan is the centre of a *municipio* of 14,000 souls; in its village of Tlaxco this intermingling reaches its extreme. There are four different peoples — Aztecs, Otomis, Tepehuas and Totonacs — all together; yet each preserves its independence in language, dress, superstitions and customs with wonderful tenacity. In regard to this

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region, Orozco y Berra, usually so valuable, becomes frequently useless. A desirable piece of work would be to examine the towns of this whole area and to present accurate data regarding their language and blood. Our contact with Aztecs and Otomis here was incidental only to our work with Tepehuas and Totonacs. Still some matters regarding them seem worthy of record. Atla (called, by Orozco, Totonac), is Aztec; it lies on the slope opposite Pahuatlan near the crest. The women are industrious weavers and several of their products are quite characteristic. *Cotones* for men, are made of white cotton, with narrow stripes of black; the neck opening is square cut; the sleeves are open along the lower side except at the wrist, where sewn close. The garment is much shorter behind than in front, but both ends are decorated with transverse bands of red and purple, which not being in fast dyes, stain the stuff badly. (Fig. 61.) Men and women wear long belts some three inches wide of white cotton with varied designs of red and orange wool; these are wrought upon the ordinary simple looms. Quite characteristic are the little sacks or pouches of white cotton with woven designs in red and yellow — geometrical, stiff floral, bird, beast, and human figures — woven in them. All men carry them. (Fig. 63.) *Quichiquimels* of young women are simple little affairs of open texture cotton, with a vertical band of red, orange and black woven in. (Fig. 62.) Those of older women are of heavier and firmer cotton with a rather abundant decoration of inwoven patterns in the usual colors — red, orange and black. At many villages and at scattered country houses in this region they have quaint sacks made of armadillo shell. The shell is removed and bent while fresh into the desired shape; it is packed tightly full of ashes to make it retain its shape while drying. It is then hung to a cord which passes over the shoulder. It is used only for holding seed corn at planting time. (Fig. 68.) There is no better place in all Mexico for study of superstition than this district of mingled population. At Atla, in front of the church and to the right of the entrance, is a hole into which a few large stones are clumsily thrown or laid. It is *brujeria*, and a little search will reveal that chickens, flowers and eggs are buried there to secure luck or to restore health. At the crest above Atla is an erosion tower or turret, a striking feature for miles around. In its eastern face opens a witches' cave — a shallow, open cavern, well sheltered and dry. It may be 50 feet wide and 6 to 10 deep. Here are a little table, a couple of small chairs, blocks for chairs, cen-

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sers, candlesticks, copal gum, festoons of yellow death flowers and immortelles, wands wrapped with corn husks and decorated with immortelles, clipped and cut paper, cotton, colored wools, etc. Here are two holes with inheaped stones, amid which are bones of fowls that have been sacrificed and *ocotes*, with *jonote* wrappings. The people of the village do not come here; only the *brujas*. Nor is it *only* the property of the Atla sorcerers — it is common to the witches of four or five neighboring Aztec towns.

Otomis of this region we saw, or learned of, at Tlacuilotepec, San Pablito, San Bartolo, Ixtololoya and Pantepec. Tlacuilotepec is the centre of a *municipio* containing both Otomi and Totonac populations. San Pablito belongs to Pahuatlan and is only a short distance from there on the road to Tenango. San Bartolo is in the State of Hidalgo between Tenango and Huehuetla; Ixtololoya is in the *municipio* of Pantepec, in Puebla. Pantepec itself, outside the *mestizos*, is made up of Totonacs and Otomis, perhaps some thirty families of the latter. Three matters only will be touched upon — dress, paper making, superstitions. At San Pablito and San Bartolo the *quichiquimels* are characteristic; they are of coarse, white cotton cloth upon which rather delicate patterns are worked in blue, red, and purple. While considerable in quantity these are never so heavily wrought but that a considerable effect of the white ground work remains. Usually a band of rather dull purple is worked near the lower border. (Fig. 70.) At Pantepec these garments become more striking. One, by no means characteristic, is shown in Fig. 2. It is of coarse white cotton with heavy embroidered patterns in various bright colors. Far more characteristic are some which approach the Totonac types of the same village (cf. 65, 66, 67) but are quite readily distinguished by their smaller size, their usually darker (including black) embroidered designs and their absolutely complete decoration; hardly an inch of the original white ground of the garment is left exposed.——The art of beating paper from bark survives in many of these Otomi towns. San Gregorio (District Tenango, Hidalgo), Xalapa (District Zacualtipan, Hidalgo), San Pablito (Mun.° Pahuatlan, Puebla), and Ixtololoya (Mun.° Pantepec, Puebla) are towns where the art flourishes. At San Pablito two kinds of bark are used: *moral* gives a whitish, *xalama* a purplish paper. The bark is best gathered when full of sap, but is kept after drying. A board is used for a foundation on which to beat, A stone approximately rectangular and generally with the corners grooved for

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convenient grasping is used for a beater. The bark is carefully washed in lyewater, taken from maize that has been prepared for *tortillas*; it is then washed in fresh water and finally boiled until it shreds readily into slender strips. These are arranged upon the board — first a boundary line for the future sheet of paper is laid out and then strips are laid near together lengthwise within this outline. They are then beaten with the stone until the spread fibres are felted together. The sheets are dried in the air, folded, and done up in packages of a dozen, which sell for three *centavos*. The work is done by women and usually in the houses with a certain degree of secrecy. The sound of the tapping of the stones is, at certain times, to be heard through the whole village (Fig. 72, board and two beaters). There is a large demand for this paper. It is not used, either for wrapping or for writing, but only for *brujeria* and ceremonies.

Thus, it is cut into *muñecos* (figures of persons, horses, or other creatures) upon which to practice witchcraft. At a trial in Pahuatlan the judge found upon the prisoner a figure cut in such paper intended to represent him (the magistrate): it had been sewn through the body and the lips were sewn through—this to prevent his pronouncing a sentence. By burying these about the house or *corral* of an enemy harm is wrought him or his animals. Mr. Albert Culin, an American who has lived some years at San Bartolo, has had many left at his house; he says they spot the place of the heart with blood and thrust spines through them. In the cave behind and above San Bartolo piles of them are sometimes left after gatherings of *brujas*. Bunches of them are left at places in the mountain roads to be trodden under by the passers. An old man at Pantepec says they are also useful in curing disease; a *bruja* will cut a figure to represent his patient patron: This is then worn by the subject at the place of the disease.——Otomi Indians in the *Municipio* of Tlacuilotepec (at Cuaxtla for example) celebrate annually *El Costumbre* ("the custom"). They believe that Montezuma will come again, and that, meantime, he it is who gives health, crops and all good to the people. They prepare a feast in his honor, of which he is believed to partake with them. An enclosure is prepared in a retired spot and a table made; upon it they place many *muñecos* of paper. Formerly they used the bark paper for these but now they buy paper in the *tiendas*. These figures may be so many as to cover the table two inches deep. They shove money — usually small silver pieces — under these figures. *Guajalotes* (turkeys),

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hens, or other offerings are slain and the blood from the headless bodies is sprinkled over the *muñecos;* this they do that Montezuma may not be annoyed and that he may give them the things they may desire. After the feast the money and the figures are left upon the table and the *mestizos* steal the former.——San Pablito is renowned for its *brujerias.* They make much use of *muñecos* of wood of various sizes. A shoemaker in Pahuatlan drives a considerable trade in making shoes for these. He has little lasts for the purpose and sells a pair for five or six reales. Black shoes are made for male figures: red morocco ones for female. They also make small hats, *serapes, enaguas, quichiquimels,* etc., for these figures. Some of these they place in the church, or in the *sanctuario* where they hold their *costumbre.* They remove them from the church when they know the priest is coming. Others they take to a lake — famous for pilgrimages — in the District of Tenango, near San Pablo el Grande, where they leave them on the bank, or cast them into the water as offerings. They also throw money and other offerings into the lake. Don Pablo Lyra, *Jefe politico* of Tenango, thoroughly informed regarding the Indians of the whole region, tells me that the lake is less patronized than formerly. While visited by Otomis (San Pablito and other towns) it is most sought by Huaxtecans who come in large parties, long distances. They visit it (a) when they have drought, for fear that the siren who dwells in it is annoyed at their neglect to give her gifts to propitiate her. (b) When there are too copious rains, to beg her to desist. (c) When crops are destroyed, to placate her. Sometimes two or three hundred in a company have passed through Huehuetla, where until lately Don Pablo lived. They carry their figures of wood, cloth, or clay: also of metal. These are shod, clad, and hatted. They carry various seeds and grains, which they throw into the water and some throw money therein. They sacrifice turkeys and hens. Sometimes the bands remain several days and dance and feast on the shore.— — The Pahuatlan shoemaker says that sometimes they plant grain at the water's edge so that it may grow and yield food for the Lake: and that food and clothing are sometimes buried at the edge.

The Tepehuas.

Orozco y Berra says: "Joined to the Totonaco there is met a spot formed of various pueblos in which they speak now one, now the other of these languages (Tepehua and Otomi) or both together. The *tepe-*

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hua we have not encountered outside this place, and we have not been able to learn whether it is the same as, similar to, or different from some of the known languages." He then states that Tepehua is spoken exclusively only at the pueblo of San Francisco of the curacy of Huayacocotla. He then gives a list of four towns where Tepehua and Otomi are jointly spoken. All five of his Tepehua towns are in the State of Vera Cruz and he considered the language confined to that state. In this he is in error. Huehuetla, (Dist. Tenango, Hidalgo), is purely Tepehua, and a large town (*Sup.*, Pl. XXIX) Tlaxco in the State of Pueblo, is in part Tepehua. We were unable to work out the list of Tepehua towns for lack of time, but there are several to add to the list. We hope to later make a study of the Tepehua language, but suggest now its probable relation to Totonaco. In character the Tepehuas are notably conservative. The Otomis, who live in the same villages with them, will readily go out to service with whites; the Tepehuas do not care to do so—and if they consent at times, it is only for a few days and as a favor. Nor will they eat at their employer's house, but carry their food home with them.

The women weave fine and strong belts with white cotton foundation and heavy black woolen raised geometrical figures. They wear two kinds of *quichiquimels:* one, the usual, is made of light and open cotton stuff with ribbons sewed on for decoration, one or two bands of red embroidery, and a few figures—generally of bird and quadruped, though also of geometrical designs. (Fig. 64.) The other style, worn by older women, contains more and heavier embroidery within a band of bright color running parallel to the edge of the garment. In *camisas* the decoration is black silk work similar to that of the Tlaxcalans and Aztecs near Puebla de los Angeles. Many of the men wear garments made of homespun cotton, but with no peculiarity in the cut or the make up. It is said that the men of some Tepehua towns have embroidered animal and bird figures on their trousers. We have not seen such. The women are somewhat particular in regard to the cleanness of their garments. Their plain white *enaguas*, white *camisas*, *quichiquimels* already described and black belts make a good combination. (*Sup.*, Pl. XXX.) They wear many necklaces of bright beads. Their hair is made up into two braids which at the tips are braided in with black, brown, red, maroon or green tape: the braids are brought together above the head and knotted there over the central parting, which runs full length from front to rear.

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Of course these Indians are agricultural. At Huehuetla, which is on a considerable stream, much fishing takes place. Casting and other nets are used. A certain kind of night fishing is picturesque. Boys and women, less frequently men, go to the river at night with blazing bunches of corn husks for torches in one hand and a short machete in the other; they wade out into the stream and look carefully at the stony bottom. The instant a fish is seen a sudden stroke is made with the machete and the injured or dead creature seized. Recently in this whole region the Indians have learned to explode dynamite in fish-y waters: the havoc has been fearful, and stringent laws are in force against a practice by which the streams would soon be depleted. Mr. Culin tells me that the Tepehuas are fond of a certain worm for food, which the Otomis will not eat. The creature is described as several inches in length, of a rich brown color, with a velvety sheen, though a hard, shelly exterior; it is the interior only that is eaten.

The same gentleman called my attention to the fact that there are several celebrations here of a popular kind. The favorites are two that take place at the same time, the two sets of performers occupying different parts of the plaza. These are the Pastores and the Snake Dance—*Danza de la culebra.* In the former the players carry *teponastls* made of exceedingly hard wood. These they carry on the finger and strike with a little stick. They are of the ancient form, but *small:* many of them are adorned with tissue paper decorations. (Fig. 69.) The songs in both these dances are in Tepehua. In the snake dance there are two male leaders and a *malinche:* it derives its name from a great snake, with a wooden head and a body of rags, which is carried and plays a part: it is painted with native pigments —chiefly yellow and white. An object in the *danza* is to kill the snake, and various players try in turn to accomplish that end; finally the *malinche* (woman) succeeds. Unfortunately we had no opportunity to witness these dances. At Huehuetla ancient idols and parts of figures are now objects of veneration. A number such are in the keeping of a certain man, who attends to their receiving copal, candles and flowers at proper times. They are dressed with proper garments and hats. On certain occasions they are brought out and worship ceremonies conducted. San Miguel's Day (Sept. 16th,) the time of sowing, the time of harvest and the time of the first cutting of sugar cane, are fixed times for their employment. On these occasions incense and candles are burned; the idols are taken in the hands and the wor-

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shipers dance to the sound of music: at the same time the idols are moved and are believed to be dancing of their own volition with the devotees. They thus show their good will and will send the desired blessings. When there is too much rain the worshipers go in procession with these idols to the river, playing music and dancing the idols; when there arrived they peg down little *ayates* (carrying cloths) and *costales* (sacks) made for the occasion in the water *against* the flow—as if to dam it back. On the other hand, in time of drought, the procession goes with the idols to a cave where there is a feast of *tamales*, *atole*, etc., and a dance in which the participants hold wands wrapped with corn husks and tipped with everlasting flowers.

The Totonacs.

These Indians, forming a considerable population in the States of Puebla and Vera Cruz — perhaps nearly 100,000 — are linguistically related according to Orozco y Berra with the Huastecans. We have seen them only at Santa Maria (a village belonging to Tlacuilotepec) and Pantepec and our stay among them was brief. They—as well as the Otomis, Aztecs, and Tepehuas of the same district are great raisers of cane and there are hundreds of little shelters among these magnificent mountains where the Indians manufacture their sugar. There is also much fruit raised, especially bananas and pineapples. At Santa Maria the men wear *cotones*, of a black and white striped stuff, which are longer in front than behind. The women wear *quichiquimels* of rather good heavy cotton: the neck opening is overhemmed with black wool and narrow lines of black wool divide each face of the garment into two unequal parts. Lines of rosettes and other small patterns in various colors and a band of red running parallel to the border of the garment form the decoration (Fig. 65).

Pantepec is situated on the crest of a ridge overlooking a grand valley. The houses are built of poles which are daubed over with mud until a smooth, fairly finished wall is secured. The thatch is heavy and solid and well laid: it projects far beyond the walls and is squarely trimmed (*Sup.*, Pl. XXXV), the lines where the roof slopes meet are not sharply finished, but rounded, which gives, at a distance, a deceptively circular appearance to the house.——The Totonacs do a great deal of fishing. The favorite method is with a little pocket-shaped net which is attached to a U-shaped bow tightly strung with a cord. The ends of the bow are sharp and projecting beyond the

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cord. This is set in the water so that the straight cord edge is at the bottom of the stream and the points thrust into the bottom, while the bow is held upside down ∩ and fish are driven into the net. The women of Pantepec (*Sup.*, Pl. XXXVII, XLIV) wear great *quichiquimels* of cotton wonderfully embroidered with heavy patterns of brilliant wools. They are regularly larger, more brilliant, and less solidly worked than those of the Otomis in the same town: red, yellow, orange, green and black may be worked into a mass of designs on a single garment. They are often worn with the points downward instead of horizontally (Figs. 66, 67.) Their *enaguas* are, like those of the Tepehuas, plain white cotton and rather closely bound about the body. The women dress their hair as the Tepehuas, but are more prone to use bright colored ribbons with it. Some of the Otomi and Totonac women in the Plaza at Pantepec are really gay with hair ribbons. They also wear many necklaces of gaudy beads and coral. Mothers carry their babies on the back, set diagonally, crosswise or astride and tie them firmly in place with a cotton *ayate* knotted in front, thus leaving their hands free for any movement. (*Sup.*, Pl. XXXIX.) Formerly men wore wide-legged cotton trousers, the lower part of which for several inches in width was made in most elaborately patterned open drawn work. They are now getting to be rare.——The Totonacs here are even more addicted to *danzas* and popular festivals than the Tepehuas. They also use the small *teponastles*. Among their *danzas* are the snake dance and the *Pastores*. The following claims to be a complete list with their dates:

Carnival: *Los Toros*: the bulls: a *malinche* takes part: a *pito* or whistle made of cane is used.

June 24: *Santiago*.

Vibora: snake. Much or quite the same as at Huehuetla.

Oct. 1st *Monarca:* monarch.
Tocotin:
Españoles: Spaniards.
Moros: Moors.
Las Inditas: The Indian women.

These five are in progress at the same time. In the *last* one men are dressed in women's clothing.

Dec. 25th: *Los Pastores:* the Shepherds. Teponastles are used.

The *Costumbre* at Santa Maria is highly interesting. Four persons, three men and one woman, the latter of whom is chief, direct it. Its date is not exactly fixed but varies with the season. It is celebrated to secure health, weather and crops during the coming year and may be

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especially held at time of sickness to free the people of the pestilence. Everyone attends and each brings something to the feast. Not only do men, heads of families, contribute, but widows and unmarried women. The celebration takes place in some selected house of large size and lasts two days. Floral decorations are constructed in the corners of the room and candles and incense are burned. Each person the first day brings a handful of earth from his field; this is placed upon the floor and the blood of turkeys, hens, and other animals slaughtered for the occasion, is sprinkled over it. After feasting and drinking they dance. The dancers of both sexes wear crowns and neckrings of the yellow flowers of arnica and in their hands carry wands wrapped with cornhusks and tipped with arnica flowers. The second day they bring corn on the ear and beans instead of earth, and these are sprinkled with the blood. At the home going of the second day each carries with him some of the earth and seed to place in his field to render it fruitful. In the room of the feast are suspended two round paper lanterns which represent the sun (and the moon?). Upon them are stuck bits of gilt and colored paper which represent the stars: a cross of blood is marked upon them at the time of sprinkling the earth and seed. At the close of the dance on the second day children shoot at these lanterns, with slender arrows or darts, trying to break them. During the *Costumbre* each person prepares *ocotes* for his field; these are little splints of fat pine, flat, thin splints perhaps three inches long, thicker at one than the other end. There are twelve of these in a bunch and they are tied together with *jonote* bark beaten out. They are sprinkled with the blood of the sacrifices. This bunch is wrapped in a banana leaf, care being taken to have the thick end of the splints and the lower end of the leaf downward: the upper face of the leaf must go next to the splints. When properly folded this package is buried upright, *facing* the rising sun, in a little hole dug in the field. The upper end of the package just reaches the level of the ground. — — Santa Maria has its cave of idols, to which we would have been taken if time had permitted. — — Almost as interesting is the *santocalli* (saints' house) as they call their wretched little church, where the old woman (leader of the *Costumbre*) and her assistants, male and female, conduct curious pagan rites before the virgin and Señor San José with prayers some of which are Latin and others Totonaco.

NOTE.--In this paper the references are as follows: *Inds. So. Mex.* is the author's *Indians of South Mexico*. *Sup.* is the supplementary volume to the same not yet published. *Figs.* referred to are those accompanying the present paper.

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	CHOCHO.	TEPEHUA.	TOTONACO.
1. Man	ua	hōō-ā	chīsh-kō′
2. Woman	-shī	tchā-kā-ōl	pūs-kā′
3. Boy	ē′	tsāl	kā-ẇā′-chō
4. Girl	ē	ā-tsī	tsū-mā-hāt
5. Father	′-nā	kīm-pai	kīn-tā-tā
6. Mother	-nā	kī-nāt	kīn-tsī-ī
7. Husband	pā	kīm-pō-kō-ōl	kin-kō-lō
8. Wife	ī-na	kīn-tē-wī	kīn-pū-skāt
9. Son	ā	kīn-tsŭl	kīn-skā-tā
10. Daughter	ā	kin-tsí	kīn-tsū mā-hat
11. Older brother	shā shā-tū-hī	—— ——	kīm-pūsh-kō
12. Younger brother	shā shā-wē-sī	—— ——	kī-stān′-kō
13. Older sister	——	—— ——	kīm-pī-pē′
14. Younger sister	——	—— ——	shā-tsu ma-hat kī-
15. Head	-tzru-hī	āk-ṣŭl	āk-shāk [stan kū
16. Hair		ai	yāk-nĭ
17. Face		ōk-shpō	lā-kā′
18. Ear	nī	ā′-kā-shkō′l	ā-kā-shkō′l
19. Eye	ū′-ni	lāk-chōl	lā-kās-tā-pūn
20. Nose	ū′-nī	hlī-shĭn	kī-nō
21. Mouth	ā′-nī	kīl	kīl-hnī
22. Tongue	-ñī	si-mŭ-x̄āt	tsī-mā-x̄āt
23. Beard	ā zō-ā-nī	kail-tchā′-owt	kāl-tsā′-nē
24. Arm	nī	mās-tō′	pĕ-x̄ĕn
25. Hand		mā-kŭ	mā-kān
26. Leg	ī-nī	ā-tō′	tān-tsŭ
27. Foot	′-nī	tchā-hŭ′	tō-x̄ōn′
28. Heart	hĕ-nī	ā-dhū-nūt	ākl-x̄ū-nōk
29. Sun		ow-wĭl-tchān	tchĭ-tchĭ-nī
30. Moon	ō	māl-kū-yŏ	māl-kū-yŭ
31. Wind	ū	ūn	ū′-nĕ
32. Lightning	ē-rī	mā′-kā-lip-ní	mā-klĭp-nē′
33. Rain		lē-ish-kŭn	pū′-shō-nō
34. Zacate		tchā-shtŭ	tsā-kāt
35. Maize		kūsh	kū′-shī
36. Calabash		nĭpsh	nĭp-shī

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ZATECO.	CHOCHO.	TEPEHUA.	TOTONACO.
37 'g-trā	zrī-zrī-nŭ	hūkɬl	kō-kē
38	rĭ'-tzī	scow	skāk
39	rōā	yā-kākɩ	sā-kā'-kā
40	tīē	tsĭt	tsī-tsā'-kē
41	gā'tzī	tsā-pāp	tsū-tsō-kō
42	sē	shkow-wow	shmā-kō-kō
43	dzū-ā	stā-ow	shkai-yā'-wā
44 ŭ'	sĭn-dĭ'-gnū	wēēn-kŭn	wā-ka'
45	zūīn-dā'	āt-kŭn	kōt-kān'
46	dzū-hĕ-nī	hltā-kā-kŭn	tā-tā-kān'
47 'ng-kwā	nī-shā-nī	tchī-wĭn-kŭn	tchī-wīn-ā-kān
48	zī-ĕrī-shrā	tchāl-kā-nān-kŭn	skō-kŭn
49	hū-ĕrī	shtāk-nĭ	māsh-kī-kŭn
50 dŭ'	zān-gā-rī	*x*āl-thlūn-kŭn	kāl-hlŭn-kŭn
51	gū	lā-ā-tŭm	tlā'-kā-tīn
52	dzō	lā-hā-toi	tlā-kā-tōl
53	gnē	lā-hā-tūt	tla-kā-tō-tōn
54	gnūū	lā-hā-tātē	la-kā-tā-tē
55	dzoū	lā-hā-kīs	la-kā-kī-tsis
56	shu	lā-hā-tchā-shŭm	lā-kā-chā-shŭn
57	dzādō	lā-hā-tū-hŭn	la-ka-to-hon
58	tshī	lā-hā-tsŭ-hĭn	lā-kā-tsai-yŭn
59	gnāā	lā-hā-nŭ-hats	lā-kā-nā-hās
60	tē	lā-hā-kow	lā-kāl-*x*āō
61	tōng	lā-hā-kow-tām	lā-kā-*x*āō-tin
62	*x*ā	lā-hā-kow-toi	lā-kā-*x*āō-toi
63	kā	lā-hā-pō-shŭm	la-ka-pō-shan
64	kā-tē	la-ha-pō-shŭm-kow	po-shan-ma-*x*aō
65 hā	dzā-kā	tō-pō-shŭm	tō-pō-shŭn
66 ha-tē	dzā-kā-tē	tō-pō-shŭm-kow	to-pō-shŭm'-a-*x*aō
67	gnī'-kā	tō-tōm-pō-shŭm	tō-tōm-pū-shŭm
68 ō-tĕ	gnī-ka-tē	tō-tōm-pō-shŭm-kwo	to-tōm-pū-shŭm-a-*x*āo
69 kā	gnū-kā	tā-tē-pō-shŭm	ta-tē-pō-shŭm
70 kā-kō-tĕ	gnū-kā-tē	tā-tē-pō-shŭm-kow	ta-tē-po-shŭm-a-*x*āō
71 to	ngō-siento	kē-ĕ-sē-pō-shŭm	kī-tsis-pō-shŭm

lack the words for one hundred and one thousand: in the lists of Mazateco tes the hundred is plainly borrowed from Spanish. Some color words are the Chontal list. That in the same list, the Spanish word for *deer* should be the

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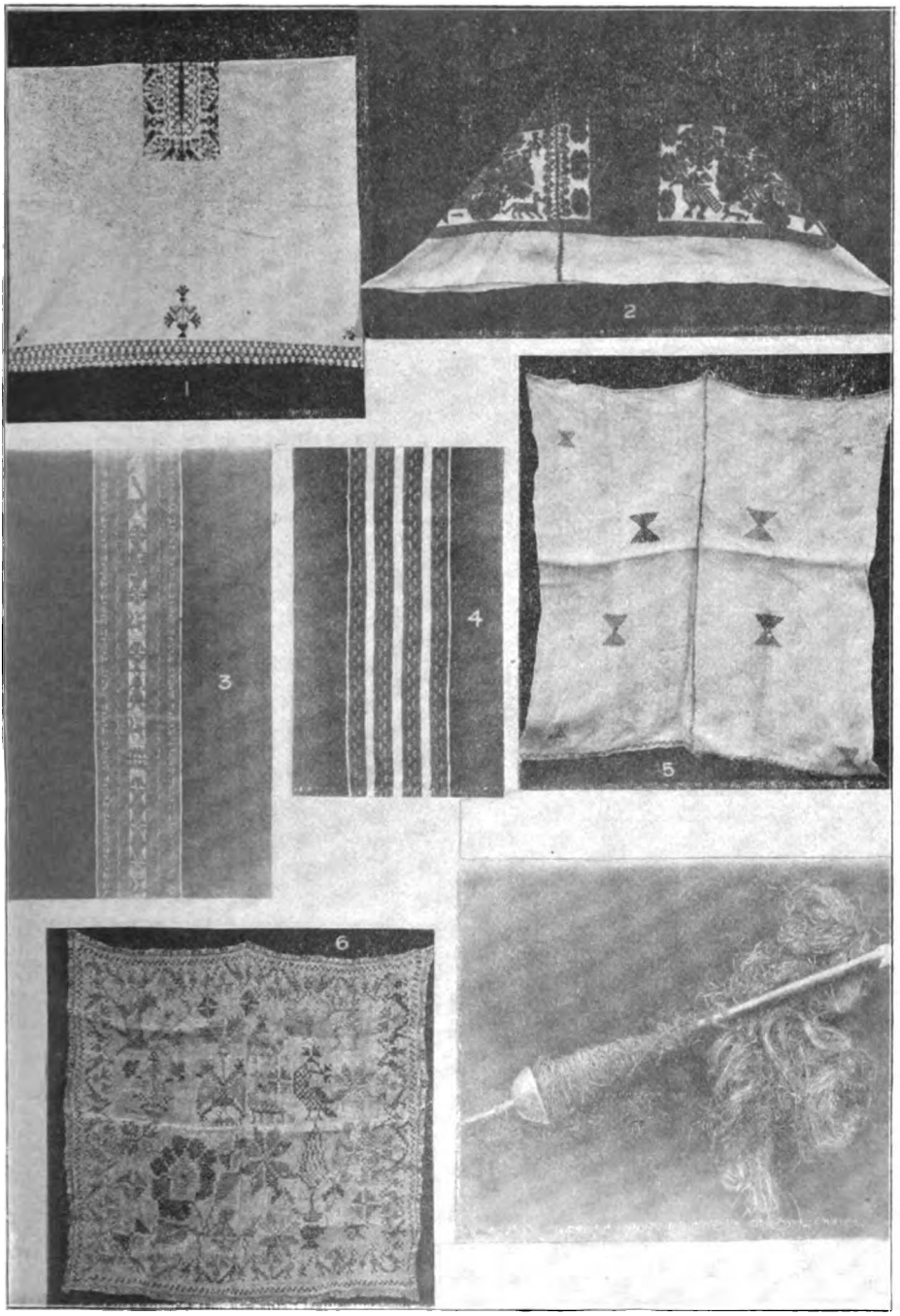

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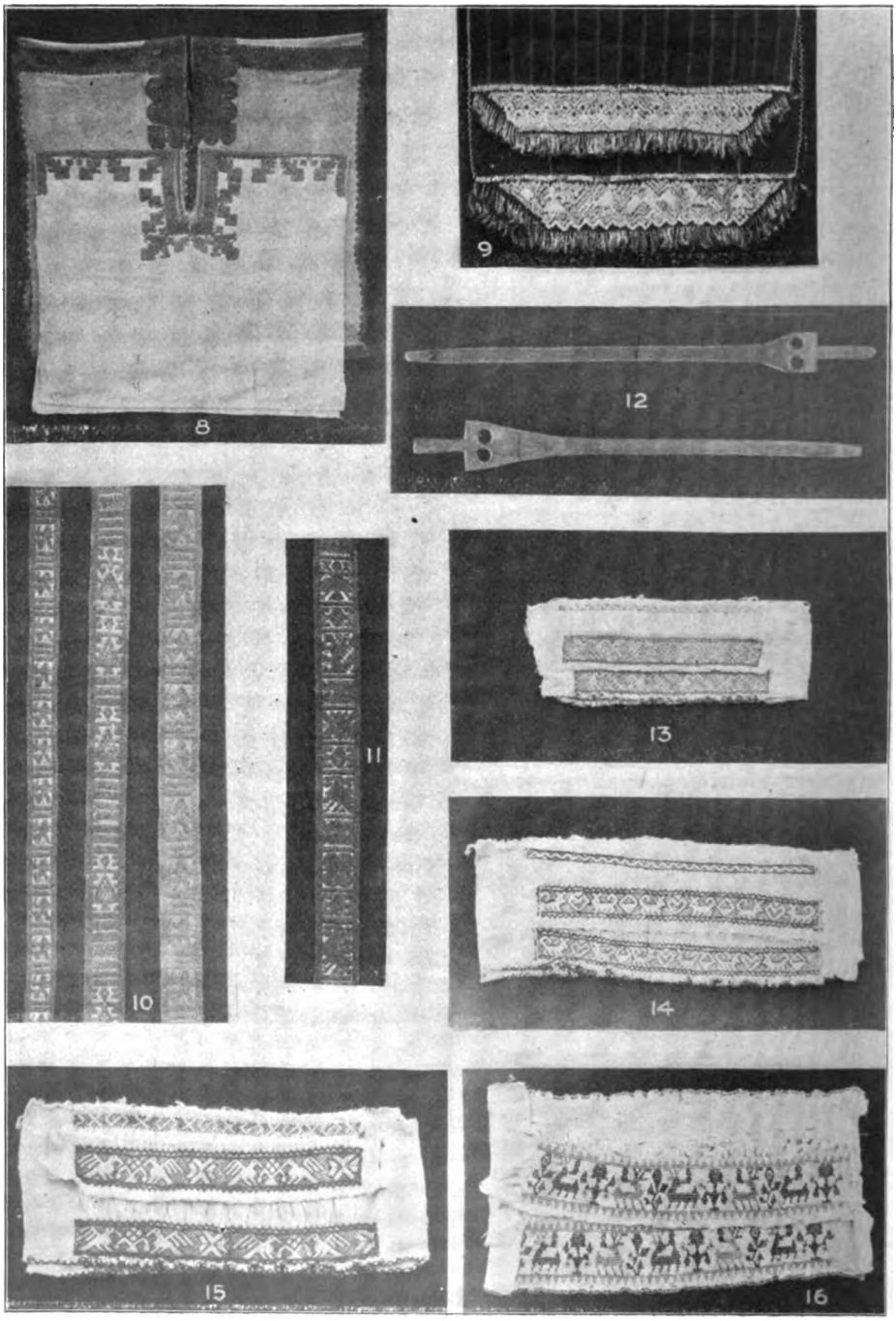

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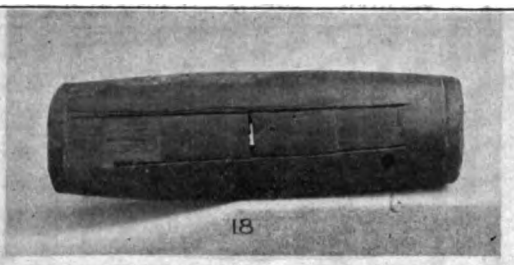
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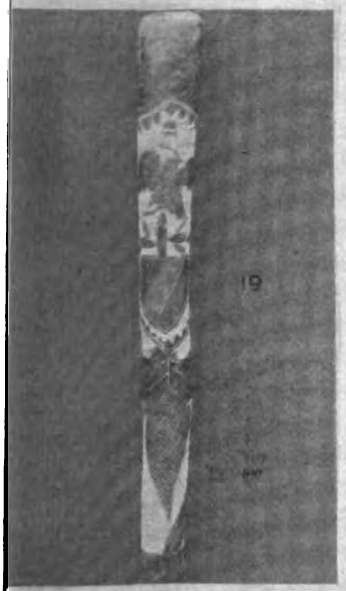
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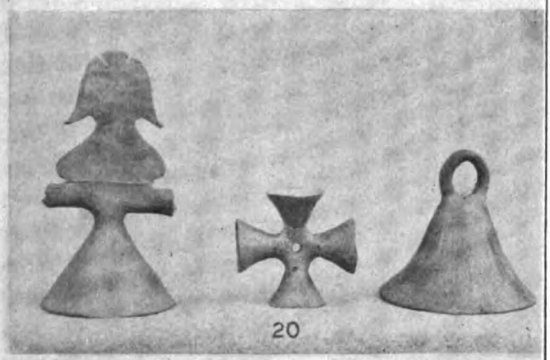
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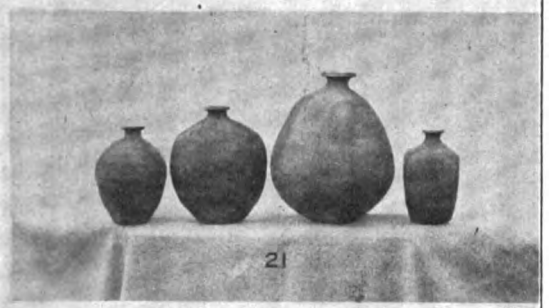
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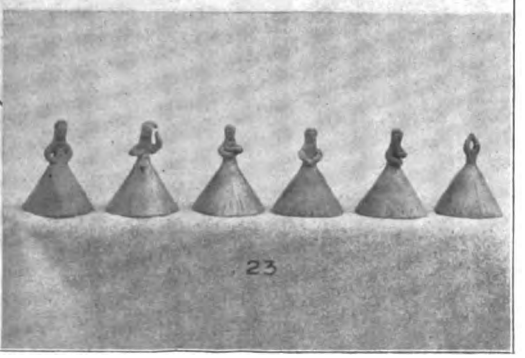
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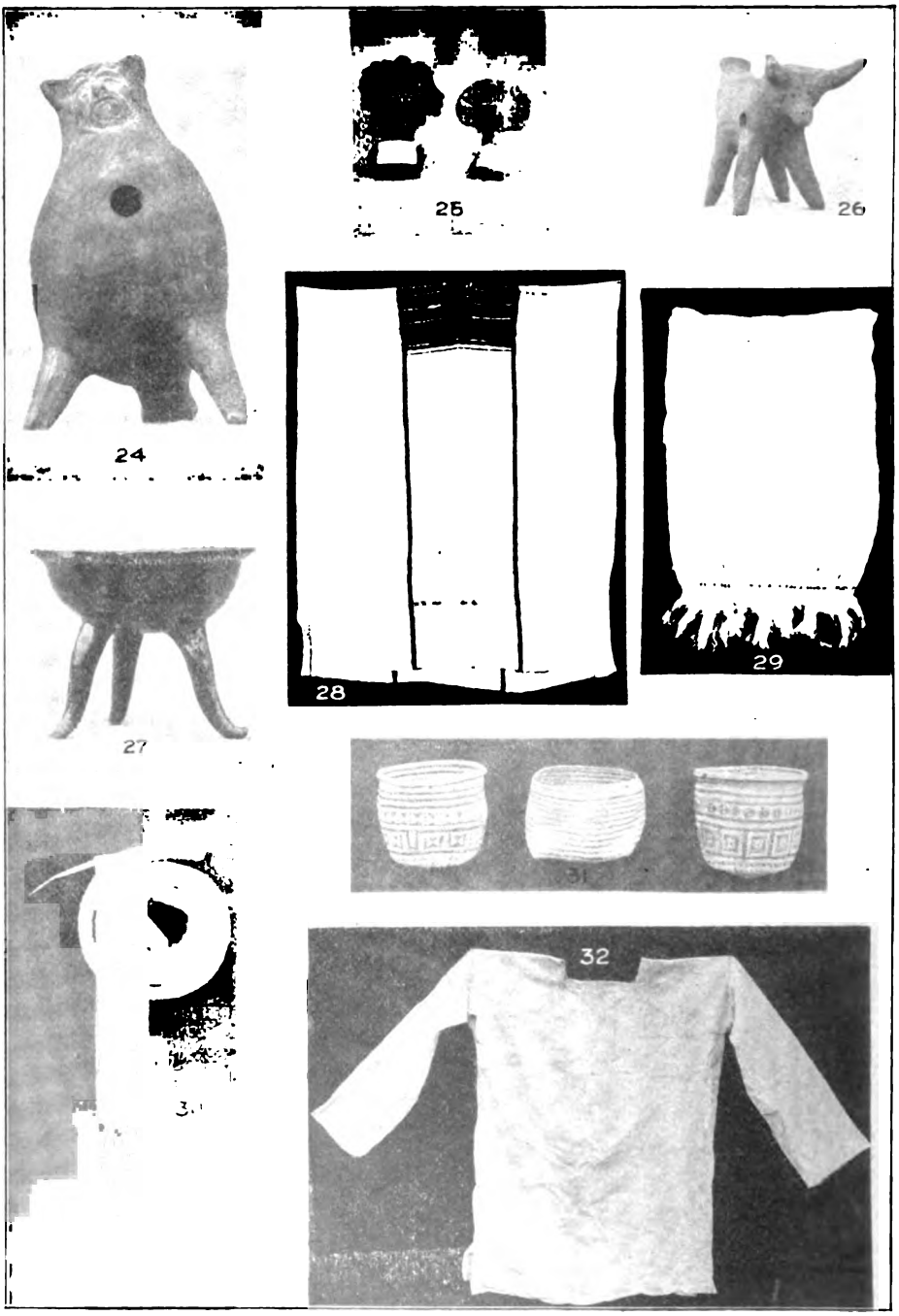

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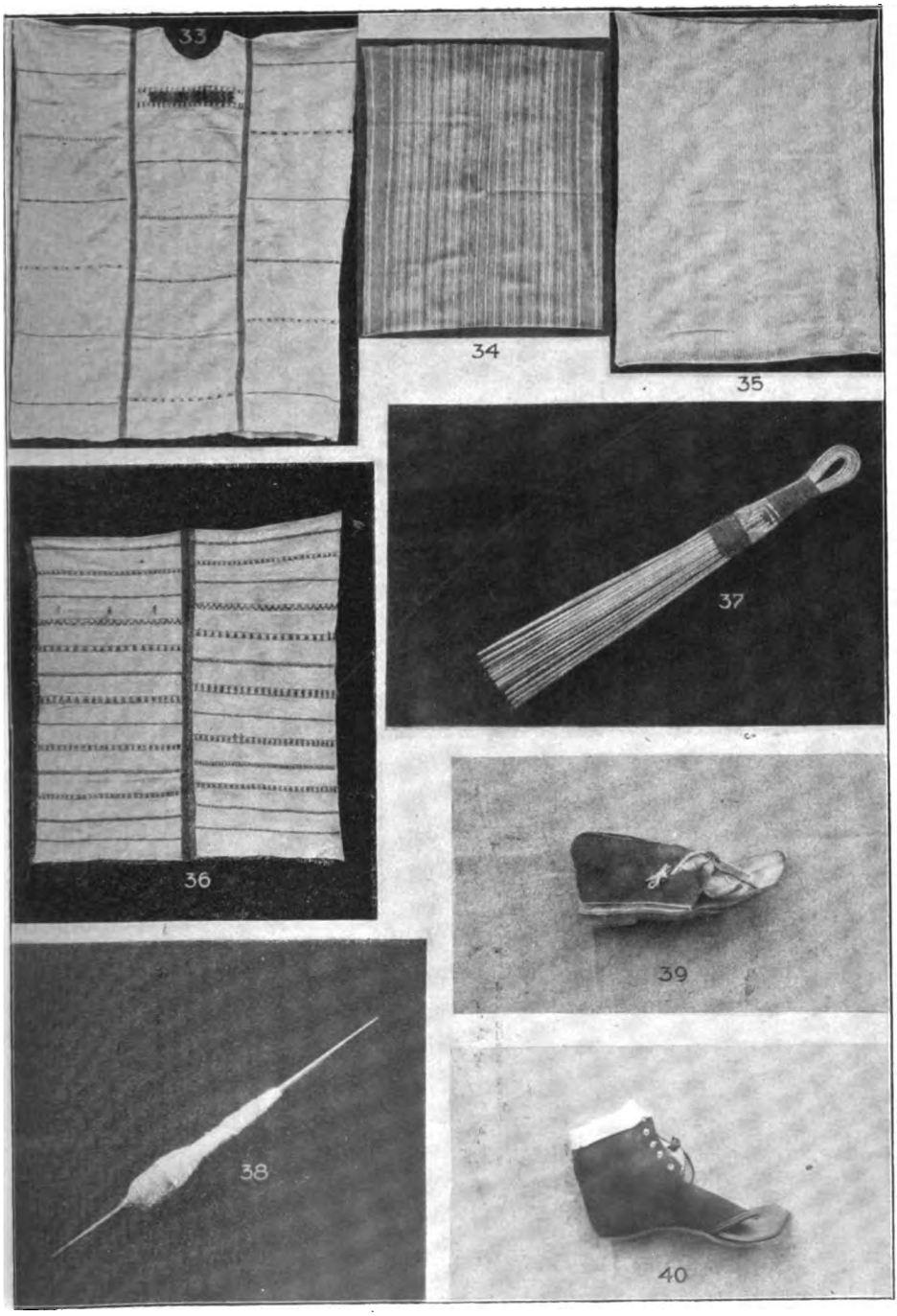

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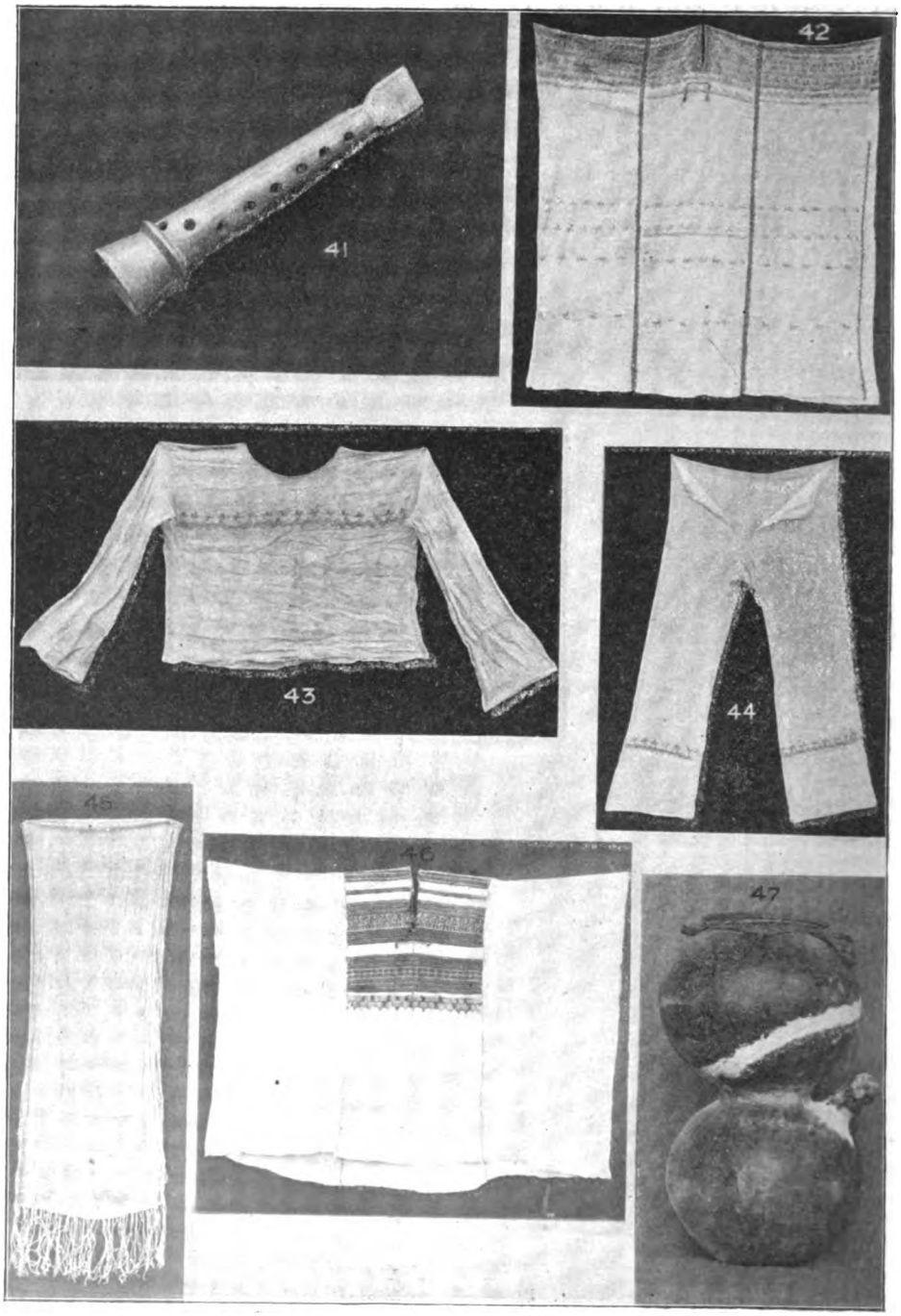

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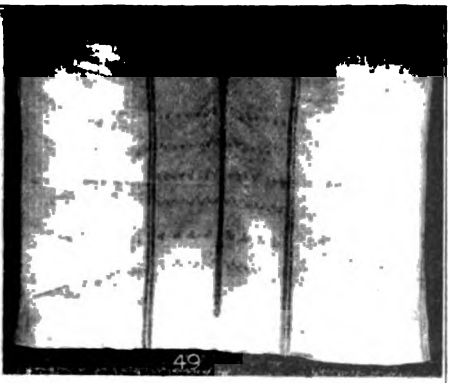

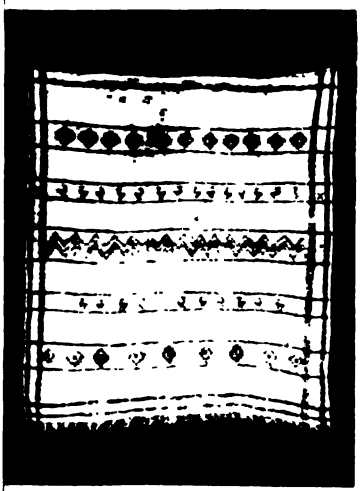

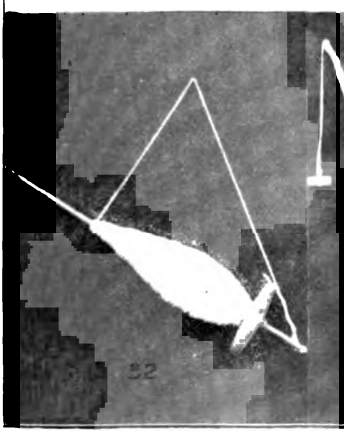

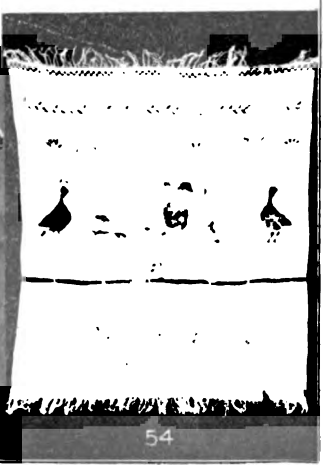

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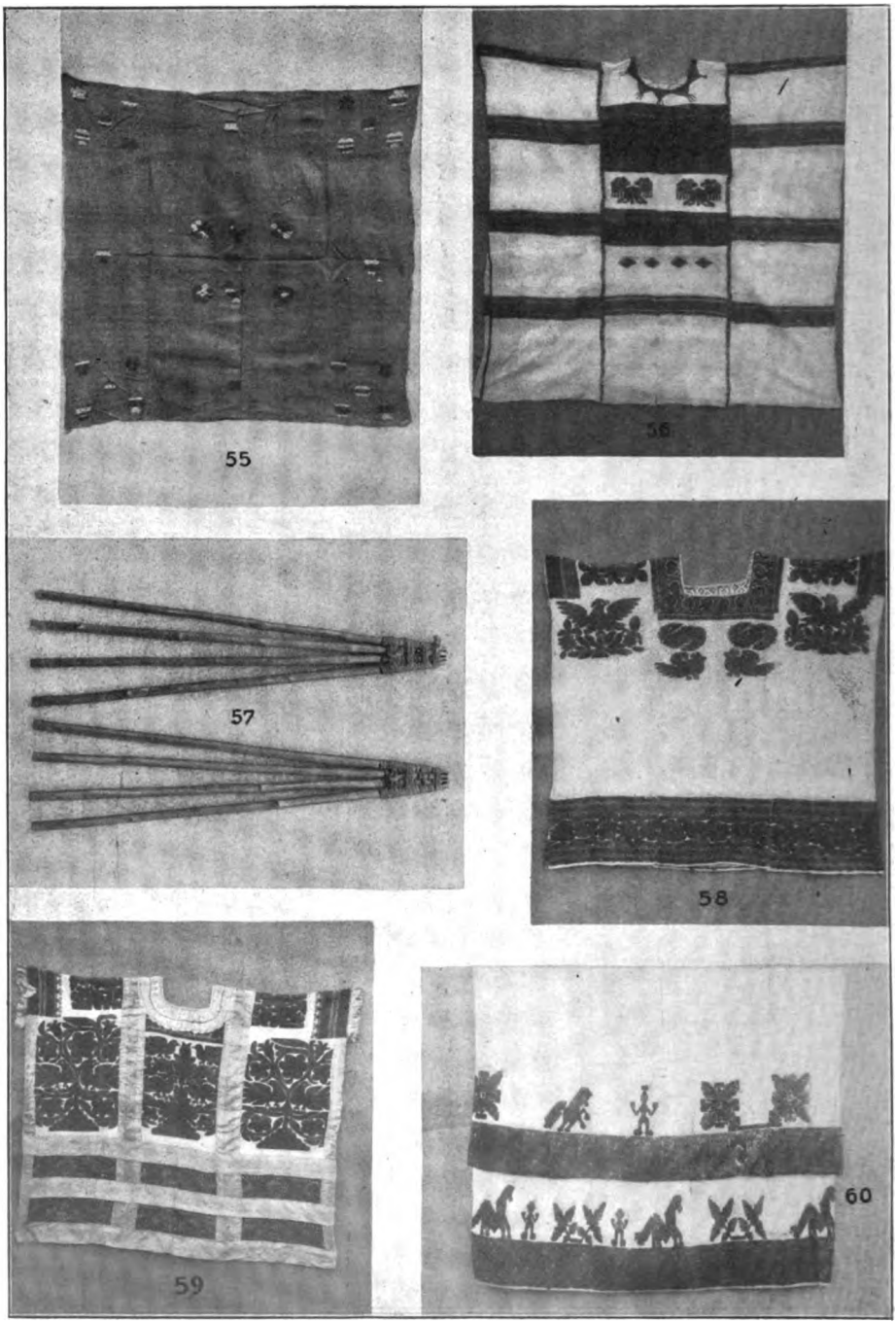

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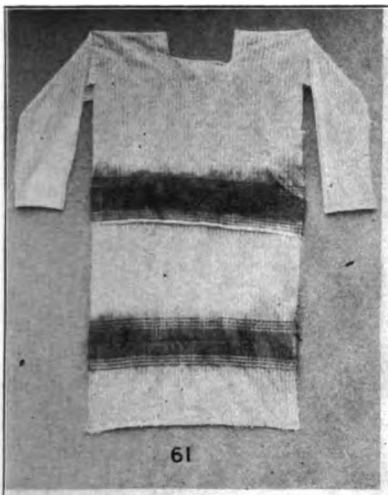

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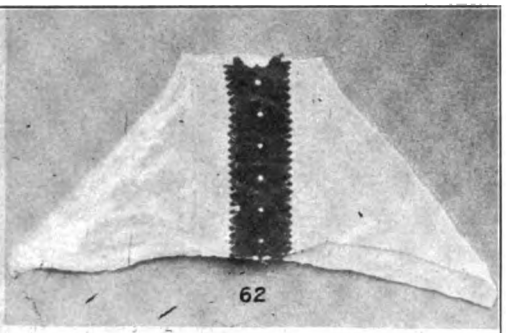

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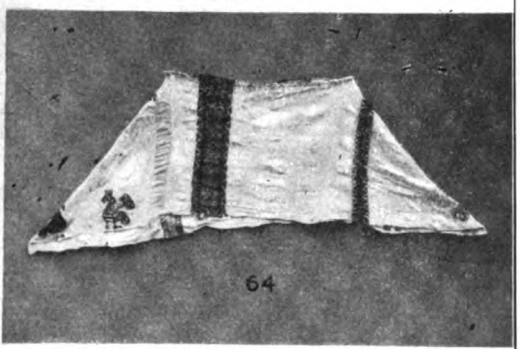

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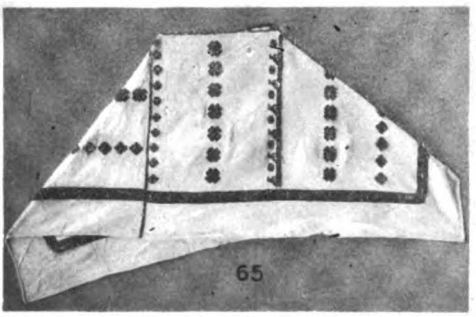

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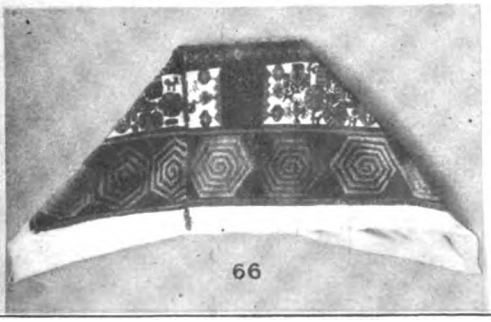

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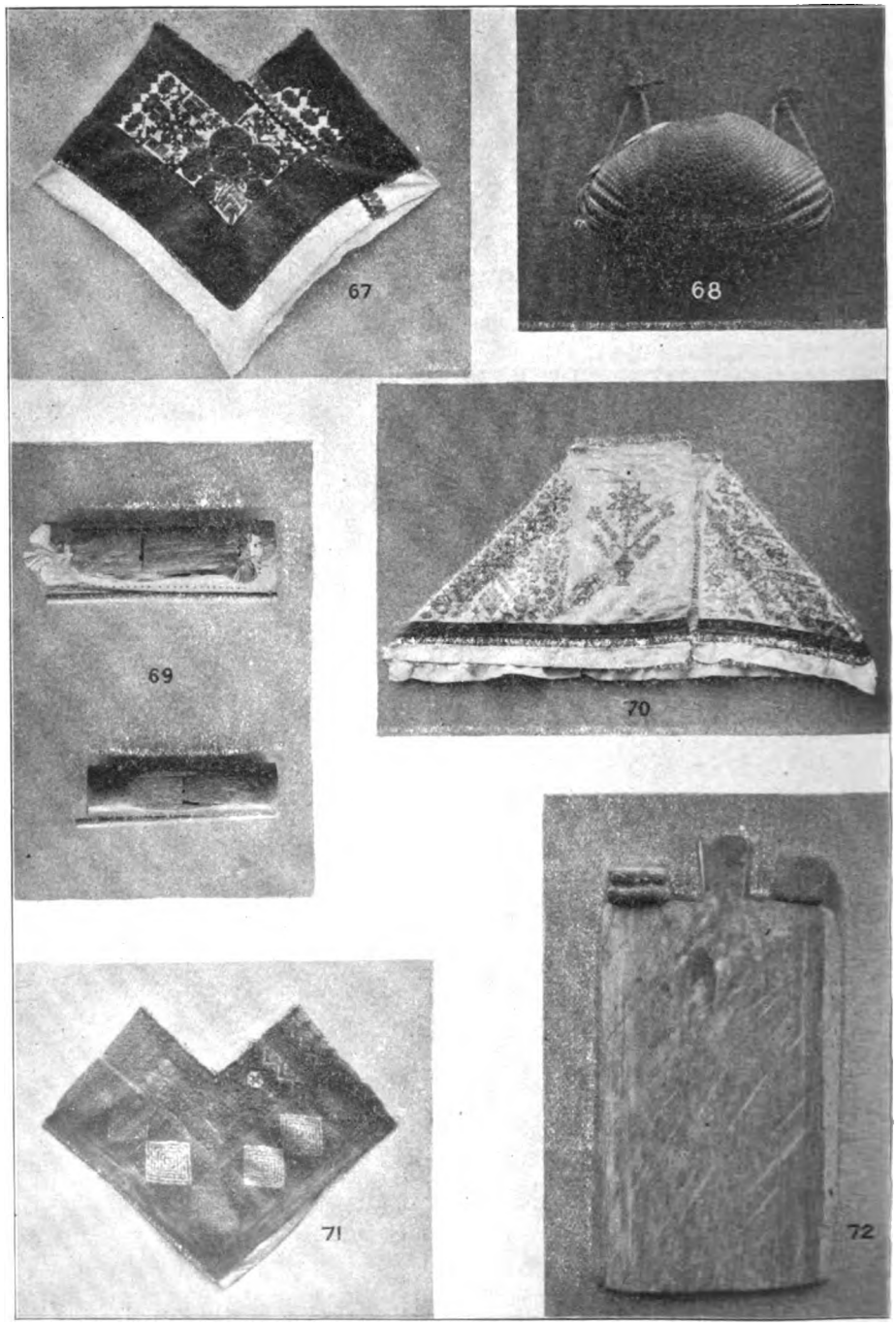

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THE FLORA OF SCOTT AND MUSCATINE COUNTIES.

BY W. D. BARNES, MORGAN PARK, ILLINOIS.
FRED REPPERT, MUSCATINE, IOWA.
A. A. MILLER, DAVENPORT, IOWA.

This enumeration of plants is compiled from a herbarium collected during ten years of field work ending with the year 1889.

As the woods of Scott county have nearly all been pastured, plants of a retiring disposition are fast disappearing, though occasionally found in Princeton township, Allen's Grove, Hickory Grove, and along the Wapsipinicon.

The change is not so noticeable in Muscatine county. The flora of Wild Cat Den is of special interest as it includes many rare species, some of which have not been reported from any other part of the state. As ponds are numerous near Muscatine and along the Cedar, aquatic plants are more abundant in this county than in Scott.

In both the native prairie plants and many introduced species are found along railroad tracks.

The authors wish to make grateful acknowledgments of the valuable assistance freely given by Prof. L. H. Bailey of Cornell, who determined the Carices; Prof. L. H. Pammel of Iowa Agricultural College, who determined the Grasses; Prof. E. J. Hill of Chicago, who determined troublesome Asters and furnished descriptions of his new oak and thistle; and also of the timely helps given in various ways by Professors McBride and Shimek of the State University of Iowa, C. R. Ball of Iowa Agricultural College, R. I. Cratty of Armstrong, Iowa, Agnes Chase of Chicago, Dr. Radenhausen of the Davenport High School, Supt. F. M. Witter of Muscatine, and other co-workers.

The nomenclature of the Sixth Edition of Gray's Manual has been followed throughout, except in the genus Carex, in which the names given by Prof. Bailey have been retained.

1900. THE AUTHORS.

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RANUNCULACEA.

Clematis, L. Virgin's Bower.

1. *C. Virginiana,* L.
   River banks and borders of thickets; infrequent.
2. *C. Pitcheri,* Torr. & Gray.
   Sandy soil along rivers; frequent. A form with cream-colored flowers grows at Moscow.

Anemone, Tourn.

3. *A. Caroliniana,* Walt.
   Sandy, alluvial soil along Cedar and Wapsipinicon Rivers, Muscatine Island, Camp McClellan. Infrequent, though often abundant over small areas.
4. *A. cylindrica,* Gray.
   Hilly woodlands; not common.
5. *A. Virginiana,* L.
   Woods and river banks; common.
6. *A. Pennsylvanica,* L.
   Rather common.
7. *A. nemorosa,* L.
   Rich wood lands; infrequent.

Hepatica, Dill.

8. *H. acutiloba,* DC. Liver-leaf.
   Rich, shady hillsides; abundant locally.

Anemonella, Spach.

9. *A. thalictroides.* Rue-Anemone.
   Open woods; frequent.

Thalictrum, Tourn. Meadow-Rue.

10. *T. dioicum,* L.
    Open woods; frequent at Allen's Grove.
11. *T. purpurascens,* L.
    Common.

Myosurus, Dill. Mouse-tail.

12. *M. minimus,* L.
    Locally abundant in sandy, alluvial soil along Cedar and Wapsipinicon Rivers; Muscatine Slough, Prof. Witter; Offerman's Island, Dr. Radenhausen.

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Ranunculus, Tourn. Buttercup. Crowfoot.

13. *R. circinatus*, Sibth.
Ponds near Muscatine; rare. (Fitzpatrick.)

14. *R. aquatilis*, L., var. *trichophyllus*, Gray.
Ponds; Neels, Muscatine Slough.

15. *R. multifidus*, Pursh.
Shallow ponds along Cedar and Wapsipinicon Rivers, Muscatine Island, Eldridge; frequent.

16. *R. abortivus*, L. Small-flowered C.
Damp woods; common.

17. *R. recurvatus*, Poir. Hooked C.
With the last but less frequent.

18. *R. fascicularis*, Muhl.
Common in open woods.

19. *R. septentrionalis*, Poir.
Damp places; common.

20. *R. repens*, L.
Wet places; frequent.

21. *R. Pennsylvanicus*, L. f. Bristly C.
Wet grounds, Muscatine Island; not common.

Isopyrum, L.

22. *I. biternatum*, Torr. & Gray.
Sandy, alluvial soil in woodlands along Cedar River. Border of woods near Fairport, near Davenport. Infrequent.

Caltha, L.

23. *C. palustris*, L. Marsh Marigold.
Marshy places; common.

Aquilegia, Tourn.

24. *A. Canadensis*, L. Columbine.
Rocky places; frequent.

Delphinium, Tourn.

25. *D. azureum*, Michx. Larkspur.
Sandy soil Muscatine Island and along Cedar River. Flowers whitish.

Actæa, L.

26. *A. alba*, Bigel. White Baneberry.
Rich woods; rather uncommon.

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Hydrastis, Ellis.

27. *H. Canadensis*, L. Golden Seal.
Rich woodlands, Seventy-six Township, Muscatine county. Scarce.

ANONACEÆ.

Asimina, Adans.

28. *A. triloba*, Dunal. Papaw.
Near Drury's Landing. Less than a mile outside of our limits.

MENISPERMACEÆ.

Menispermum, L.

29. *M. Canadense*, L. Moonseed.
Woods and river banks; frequent.

BERBERIDACEÆ.

Berberis, L.

30. **B. vulgaris**, L. Barberry.
In woods, two miles west of Montpelier.

Caulophyllum, Michx.

31. *C. thalictroides*, Michx. Blue Cohosh.
Deep, rich woods; abundant locally.

Podophyllum, L.

32. *P. peltatum*, L. May-apple. Mandrake.
Rich woods; common.

NYMPHÆACEÆ.

Brasenia, Schreber.

33. *B. peltata*, Pursh. Water-Shield.
In a pond on the sand hills along Cedar River. Lake T'w'p, Muscatine county. Found in flower, October, 1878; in 1872 a few young plants were found. The pond is now permanently dry.

Nelumbo, Tourn.

34. *N. lutea*, Pers. Water Chinquapin.
Ponds along the Mississippi River; not infrequent.

Nymphæa, Tourn.

35. *N. reniformis*, DC. Tuber-bearing Water Lily.
Ponds and slow-flowing water along rivers; frequent.

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Nuphar, Smith.

36. *N. advena*, Ait. f. Yellow Pond Lily. Spatter-Dock.
With the last.

PAPAVERACEÆ.

Sanguinaria, Dill.

37. *S. Canadensis*, L. Blood-root.
Rich woods; frequent.

Argemone, L.

38. **A. Mexicana**, L. Mexican Poppy.
Escaped from gardens; Blue Grass, Moscow, Eldridge, old field near Muscatine.

FUMARIACEÆ.

Dicentra, Borkh.

39. *D. cucullaria*, DC. Dutchman's Breeches.
Rich woods; frequent.

40. *D. Canadensis*, DC. Squirrel Corn.
Hilly woods, Drury's Landing, Ill. (Witter, Mackenzie.)

Corydalis, Vent.

41. *C. flavula*, DC.
Sandy, alluvial soil opposite Muscatine. (Mackenzie.)

42. *C. micrantha*, Gray.
Banks of Cedar River, near Moscow Bridge.

43. *C curvisiliqua*, Engelm.
Sandy embankments of the C., R. I. & P. R. R. between Davport and Muscatine; frequent. Determined at the Missouri Botanical Garden.

CRUCIFERÆ.

Dentaria, Tourn. Toothwort.

44. *D. laciniata*, Muhl.
Rich woods; frequent.

Cardamine, Tourn.

45. *C. rhomboidea*, DC. Spring Cress.
Wet meadows; common.

46. *C. rhomboidea*, DC., var. *purpurea*, Torr.
Moist woods along Wapsipinicon River.

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47. *C. hirsuta*, L. Small Bitter Cress.
Wet places; frequent.

Arabis, L. Rock Cress.

48. *A. hirsuta*, Scop.
Rocky places; Muscatine county; infrequent. Big Rock and Devil's Glen, Scott county.

49. *A. lævigata*, Poir.
Rocky soil at Wild Cat Den, Big Rock and Le Claire.

50. *A. Canadensis*, L. Sickle-pod.
Le Claire; rare.

51. *A. confinis*, Watson.
Sandy soil, Cedar River region, Noels; infrequent.

52. *A. dentata*, Torr. & Gray.
Sandy alluvial soil and borders of woods along Cedar River. Muscatine Island.

Draba, Dill. Whitlow Grass.

53. *D. Caroliniana*, Walt.
Dry sandy soil; Noels, Camp McClellan, Muscatine.

Nasturtium, R. Br. Water-Cress.

54. *N. sessiliflorum*, Nutt.
Banks of Mississippi River; frequent.

55. *N. palustre*, DC. Marsh Cress.
Wet places; common.

56. *N. lacustre*, Gray. Lake Cress.
Sloughs along Cedar River in the vicinity of Salisbury Bridge, Muscatine county. Ponds near Noels. Leaves fall off early and take root in the mud.

57. *N.* **Armoracia**, Fries. Horseradish.
Moist ground; frequent.

Barbarea, R. Br.

58. *B. vulgaris*, R. Br. Winter Cress. Yellow Rocket.
Grain field near Fairport. Railroad track, Blue Grass.

Hesperis, Tourn.

59. *H.* **matronalis**, L. Rocket. Dame's Violet.
Escaped to roadsides. Blue Grass, Locust Street, Davenport.

Erysimum, Tourn.

60. *E. cheiranthoides*, L. Worm-seed Mustard.
Banks of streams; infrequent.

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Sisymbrium, Tourn. Hedge Mustard.

61. *S. canescens*, Nutt. Tansy Mustard.
Railroad tracks, Buffalo and Fairport.

62. **S. Sophia**, L.
Railroad tracks and waste places in West Davenport and Blue Grass.

63 **S. officinale**, Scop. Hedge Mustard.
Waste places; common.

64. **S. altissimum**, L. Tumble Mustard.
Railroad track, Blue Grass, May, 1895 (single plant). Waste ground near B., C. R. & N. tracks in West Davenport (in quantity). Rock Island, 1896, (with *Salsola Kali*, L., var. *Tragus*, DC.) Eldridge, 1897. Becoming frequent.

Thelypodium, Endl.

65. *T. pennatifidum*, Watson.
Alluvial soil along the Mississippi and Cedar Rivers; not common.

Brassica, Tourn.

66. **B. Sinapistrum**, Boiss. English Charlock.
Railroad tracks; frequent.

67. **B. nigra**, Koch. Black Mustard.
Waste places; common.

68. **B. campestris**, L.
Railroad tracks: infrequent.

Capsella, Medic.

69. **C. Bursa-pastoris**, Moench. Shepherd's Purse.
Waste places; very common.

Thlaspi, Tourn.

70. **T. arvense**, L.
River front, Muscatine.

Lepidium, Tourn. Peppergrass.

71. *L. Virginicum*, L.
Frequent.

72. *L. intermedium*, Gray.
Common.

Raphanus, Tourn.

73. **R. sativus**, L.
Found with the several species of *Brassica* on railroad tracks but not persisting for more than a year or two.

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CAPPARIDACEÆ.

Cristatella, Nutt.

74. *C. Jamesii*, Torr. & Gray.
Rather frequent along sandy shores of the Cedar near the B., C. R. & N. railroad bridge. This plant has been reported as a narrow-leaved form of *Polanisia graveolens*, Raf.

Polanisia, Raf.

75. *P. graveolens*, Raf.
Sandy soil along Cedar River; infrequent.

76. *P. trachyosperma*, Torr. & Gray
Sandy soil, especially along the Mississippi and Wapsipinicon Rivers; frequent. More widely distributed than the last species.

CISTACEÆ.

Helianthemum, Tourn. Rock Rose.

77. *H. Canadense*, Michx. Frost-weed.
Dry, gravelly soil; frequent.

Lechea, Kalm. Pinweed.

78. *L. tenuifolia*, Michx.
Dry soil; infrequent.

79. *L. stricta*, Leggett.
Prairies on dry, sandy soil; infrequent.

VIOLACEÆ.

Viola, Tourn.

80. *V. pedata*, L. Bird-foot Violet.
Borders of woods, hillsides and sand prairies. Not of general occurrence but sometimes abundant locally.

81. *V. pedata*, L. var. *bicolor*, Pursh.
Border of sandy woods, Lake T'w'p., Muscatine county; with the type but infrequent or rare. May, 1891. Near Columbus Junction, Louisa county, 1890 (Prof. Witter).

82. *V. pedatifida*, G. Don.
Dry prairies; rather frequent.

83. *V. palmata*, L.
Not common in Scott county. In Muscatine county limited

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mostly to the Cedar River region. Very variable; some forms early in the season are not readily distinguishable from *V sagittata*, Ait.; others again, are much like *V. pedatifida*, G. Don.

84. *V. palmata*, L., var. *cucullata*, Gray.
Low grounds; common in nearly all soils.

85. *V. sagittata*, Ait. Arrow-leaved Violet.
Dry soil; not common.

86. *V. blanda*, Willd. Small White Violet.
Wet places, Cedar River region.

87. *V. primulæfolia*, L. Primrose-leaved Violet.
Damp ground, Lake T'w'p., Muscatine county. Confined to a small area.

88. *V. lanceolata*, L. Lance-leaved Violet.
Wet places and margins of ponds, Lake T'w'p., Muscatine Co.

89. *V. pubescens*, Ait. Downy Yellow Violet.
Woods; common.

CARYOPHYLLACEÆ.

Saponaria, L.

90. **S. officinalis**, L. Soapwort. Bouncing Bet.
Railroad tracks and near dwellings; common.

91. **S. Vaccaria**, L.
Railroad tracks; Davenport, Blue Grass.

Silene, L. Catch fly. Campion.

92. *S. stellata*, Ait. Starry Campion.
River banks and open woods; common.

93. *S. nivea*, Otth.
Wild Cat Den. Railroad tracks near Montpelier and near Park Place on the Wilton Branch of the C. R. I. & P. Ry.

94. *S. antirrhina*, L. Sleepy Catchfly.
Dry soil; frequent.

95. **S. noctiflora**, L. Night-flowering Catchfly.
Streets, East Davenport. Along railroad tracks, Muscatine Island.

Lychnis, Tourn.

96. **L. Githago**, Lam. Corn Cockle.
Grain fields and railroad tracks; frequent.

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Arenaria, L.

97. *A. lateriflora*, L. Sandwort.
Sandy soil; rather common.

Stellaria, L.

98. **S. media**, Smith. Chickweed.
Moist, shady places in towns.

99. *S. longifolia*, Muhl. Long-leaved Stitchwort.
Noels, Allen's Grove, Wild Cat Den.

Cerastium, L. Mouse-ear Chickweed.

100. **C. viscosum**, L.
Sandy soil; Noels. Abundant locally.

101. **C. vulgatum**, L.
Frequent.

102. *C. nutans*, Raf.
Moist places; common.

PORTULACACEÆ.

Portulaca, Tourn.

103. **P. oleracea**, L. Purslane.
Cultivated and waste grounds; common.

Claytonia, Gronov.

104. *C. Virginica*, L. Spring Beauty.
Moist wooded hillsides; abundant locally.

HYPERICACEÆ.

Hypericum, Tourn. St. John's-Wort.

105. *H. Ascyron*,
Banks of streams and ditches; not common.

106. *H. cistifolium*, Lam.
Dry soil; common.

107. *H. maculatum*, Walt.
Moist soil; infrequent.

108. *H. mutilum*, L.
Low ground; frequent.

109. *H. gymnanthum*, Engelm. & Gray.
Low ground; frequent.

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110. *H. nudicaule*, Walt. Orange-grass. Pine-weed.
Sandy soil; Lake T'w'p, Muscatine county, 1890, and Noels, Scott county. Muscatine Island, 1898, (Miss Hoffmann).

Elodes, Adans. Marsh St. John's-Wort.

111. *E. campanulata*, Pursh.
Wet grounds along Cedar River. Noels.

MALVACEÆ.

Malva, L. Mallow.

112. **M. rotundifolia**, L
Yards and waste places; frequent.

113. **M. sylvestris**, L.
Escaped from gardens near old habitations; infrequent.

114. **M. crispa**, L.
Sparingly escaped at Pleasant Prairie, Muscatine county.

Callirrhœ, Nutt.

115. *C. triangulata*, Gray.
Sandy soil; local. Moscow. Near Davenport (Shimek).

Malvastrum, Gray.

116. *M. angustum*, Gray.
Government Island, August, 1865 (Dr. C. C. Parry). Rocky roadside east of Gilbert, 1898. Abundant locally.

Sida, L.

117. **S. spinosa** L.
Rather frequent in dry soil; Muscatine county; Buffalo.

Abutilon, Tourn.

118. **A. Avicennæ**, Gaertn. Velvet Leaf.
Common and locally abundant in waste places and cultivated fields.

Hibiscus, L. Rose Mallow.

119. *H. militaris*, Cav. Halberd-leaved R.
Frequent in wet grounds along rivers.

120. **H. Trionum**, L. Bladder Ketmia.
Roadsides; frequent. Abundant along many roadsides in Blue Grass T'w'p., Scott county.

TILIACEÆ.

Tilia, Tourn.

121. *T. Americana*, L. Basswood.
Rich woods; common.

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LINACEÆ.

Linum, Tourn.

122. *L. sulcatum*, Riddell. Yellow Flax.
Dry sterile soil; Cedar River region, Montpelier.

123. **L. usitatissimum**, L. Common Flax.
Railroad tracks; common.

GERANIACEÆ.

Geranium, Tourn. Cranesbill.

124. *G. maculatum*, L.
Open woods; common.

125. *G. Carolinianum*, L.
Sandy soil; along Cedar River; Muscatine Island and Noels.

Oxalis, L. Wood Sorrel.

126. *O. violacea*, L.
Open woods; common.

127. *O. corniculata*, L., var. *stricta*, Sav.
Common.

Impatiens, L. Balsam. Jewel-weed.

128. *I. pallida*, Nutt. Pale Touch-me-not.
Moist shady places; not infrequent.

129. *I. fulva*, Nutt. Spotted Touch-me-not.
Habitat same as that of preceding species. Rather common.

ZYGOPHYLLACEÆ.

Tribulus, L.

130. **T. terrestris**, L.
Railroad track near Muscatine and Fruitland. Infrequent.
Fruit greatly resembles common sand-burr.

RUTACEÆ.

Xanthoxylum, L.

131. *X. Americanum*, Mill. Prickly Ash.
Dry woods, especially along rivers; frequent.

Ptelea, L.

132. *P. trifoliata*, L. Hop-tree.
Dry soil, borders of woods, etc.; frequent.

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SIMARUBACEÆ.

Ailanthus, Desf.

133. **A. glandulosus**, Desf. Tree of Heaven.
Escaped to roadside near Oak Hill School, Buffalo T'w'p., Scott county.

CELASTRACEÆ.

Celastrus, L.

134. *C. scandens*, L. Waxwork. Climbing Bitter-Sweet.
Woods; frequent.

Euonymus, Tourn.

135. *E. atropurpureus*, Jacq. Burning Bush. Wahoo.
Woods and sandy alluvial soil; infrequent.

RHAMNACEÆ.

Rhamnus, Tourn.

136. *R. lanceolata*, Pursh.
Cedar River region; Princeton; infrequent.

Ceanothus, L.

137. *C. Americanus*, L. New Jersey Tea
Dry woodlands and prairies; common.

VITACEÆ.

Vitis, Tourn. Grape.

138. *V. cinerea*, Engelm. Downy Grape.
Along the Mississippi River, and less frequent along the Cedar.

139. *V. riparia*, Michx.
River bottoms and along streams; common. Frequent in woods.

Ampelopsis, Michx.

140. *A. quinquefolia*, Michx. Virginian Creeper.
River banks and woods; common.

SAPINDACEÆ.

Æsculus, L.

141. *A. glabra*, Willd. Ohio Buckeye.
One native tree in vicinity of Le Claire; formerly frequent.

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Acer, Tourn.

142. *A. saccharinum*, Wang.
Hilly woods; infrequent.

143. *A. saccharinum*, Wang., var. *nigrum*, Torr. & Gray.
Wild Cat Den; Le Claire; infrequent.

144. *A. dasycarpum*, Ehrh.
River banks and low grounds; common.

Negundo, Moench.

145. *N. aceroides*, Moench.
Along streams; frequent.

Staphylea, L.

146. *S. trifolia*, L. Bladder-nut.
Hilly woodlands; not frequent.

ANACARDIACEÆ.

Rhus, L. Sumach.

147. *R. glabra*, L.
Open woods and clearings; common.

148. *R. Toxicodendron*, L. Poison Oak.
River banks and woods; common.

149. *R. Canadensis*, Marsh.
Sand along Cedar and Wapsipinicon Rivers, and on Muscatine Island; frequent.

POLYGALACEÆ.

Polygala, Tourn. Milkwort.

150. *P. Senega*, L. Seneca Snake-root.
Dry soil; frequent

151. *P. incarnata*, L.
Dry sandy soil, Lake T'w'p., Muscatine county; scarce.

152. *P. sanguinea*, L.
Sandy and moist ground; common.

153. *P. cruciata*, L.
Mossy borders of a pond, Lake T'w'p., Muscatine county; scarce.

154. *P. verticillata*, L.
Dry hills; infrequent.

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LEGUMINOSÆ.

Baptisia, Vent. False Indigo.

155. *B. leucophæa*, Nutt.
Prairies; less frequent than the next.

156. *B. leucantha*, Torr. & Gray.
Dry soil; frequent.

Crotalaria, L.

157. *C. sagittalis*, L. Rattle-box.
Sandy soil along rivers; not common.

Trifolium, Tourn. Clover.

158. **T. arvense**, L. Rabbit-foot Clover.
Sandy soil; Cedar River region, Muscatine Island, vicinity of Buffalo and Follets.

159. **T. pratense**, L. Red Clover.
Common.

160. *T. reflexum*, L. Buffalo Clover.
Sandy soil; Cedar River region, Muscatine Island, vicinity of Buffalo and Follets.

161. *T. repens*, L. White Clover.
Fields and waste places; common.

162. **T. hybridum**, L. Alsike.
Roadsides, etc.; becoming frequent.

Melilotus, Tourn. Melilot. Sweet Clover.

163. **M. officinalis**, Willd. Yellow M.
Roadsides and waste places; infrequent.

164. **M. alba**, Lam. White M.
Common in waste places.

Medicago, Tourn.

165. **M. sativa**, L. Alfalfa.
Along railroads; not common.

Amorpha, L.

166. *A. canescens*, Nutt. Lead-Plant.
Dry sterile soil; common.

167. *A. fruticosa*, L. False Indigo.
Along streams; frequent.

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Petalostemon, Michx. Prairie Clover.

168. *P. violaceus*, Michx.
Dry prairies; rather common.

169. *P. candidus*, Michx.
Same habitat as that of the last species but less common.

Tephrosia, Pers.

170. *T. Virginiana*, Pers. Goat's Rue. Catgut.
Dry sterile soil; infrequent.

Robinia, L.

171. *R. Pseudacacia*, L. Locust.
Roadsides; frequent.

Astragalus, Tourn.

172. *A. Canadensis*, L.
Prairies; common.

173. *A. distortus*, Torr. & Gray.
Sandy soil of Cedar River region and Muscatine Island; not frequent.

Desmodium, Desv. Tick-Trefoil.

174. *D. nudiflorum*, DC.
Wooded hillsides at Wild Cat Den; scarce.

175. *D. acuminatum*, DC.
Rich woods; common.

176. *D. canescens*, DC.
Damp grounds; frequent.

177. *D. canescens*, var. *villosissimum*, Torr. & Gray.
Woodlands, Moscow. Near Follets along the Wapsipinicon River.

178. *D. cuspidatum*, Torr. & Gray.
Rich woods; infrequent.

179. *D. Illinoense*, Gray.
Prairies and dry sandy soil; infrequent.

180. *D. paniculatum*, DC.
Borders of woods; frequent.

181. *D. Canadense*, DC.
Borders of woods; common.

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Lespedeza, Michx. Bush Clover.

182. *L. violacea*, Pers.
Dry soil, borders of woods and banks; frequent.

183. *L. reticulata*, Pers.
Dry sterile hillside at Wild Cat Den.

184. *L. capitata*, Michx.
Dry soil; common.

185. *L. capitata*, Michx., var. *longifolia*, Torr. & Gray.
Dry soil; frequent.

Vicia, Tourn. Vetch. Tare.

186. **V. sativa**, L.
Railroad track and adjacent waste grounds at Blue Grass.

Lathyrus, Tourn.

187. *L. palustris*, L.
Moist places; frequent.

Apios, Boerhave.

188. *A. tuberosa*, Moench. Ground-nut.
Climbing on bushes in low rich soil; infrequent.

Strophostyles, Ell.

189. *S. angulosa*, Ell.
River banks; common.

190. *S. pauciflorus*, Watson.
Cedar River region and Muscatine Island; frequent.

Amphicarpæa, Ell. Hog Pea-nut.

191. *A. monoica*, Nutt.
Rich damp woodlands; not common.

192. *A. Pitcheri*, Torr. & Gray.
Damp woods; frequent.

Cercis, L.

193. *C. Canadensis*, L. Red-bud.
Woods along Mississippi and Cedar Rivers; not uncommon.

Cassia, Tourn. Senna.

194. *C. Marilandica*, L.
Alluvial soil; frequent.

195. *C. Chamæcrista*, L. Partridge Pea.
Dry soil; common.

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Gymnocladus, Lam.

196. *G. Canadensis*, Lam. Kentucky Coffee-tree.
Alluvial soil along the Mississippi River; not uncommon.

Gleditschia, L.

197. *G. triacanthos*, L. Honey-Locust.
Rich woods, especially along rivers; frequent.

ROSACEÆ.

Prunus, Tourn.

198. *P. Americana*, Marshall. Wild Plum.
Woods; common.

199. *P. Chicasa*, Michx. Chickasaw Plum.
Muscatine Island, near the upper end of the "Big Timber;" also on the Illinois side opposite this point.

200. *P. Virginiana*, L. Choke-Cherry.
Borders of woods and banks of streams; frequent.

201. *P. serotina*, Ehrh. Wild Black Cherry.
Woods; frequent.

Spiræa, L. Meadow-Sweet.

202. *S. salicifolia*, L
Low grounds; rather common.

203. *S. lobata*, Jacq. Queen of the Prairie.
Moist prairies and boggy places of the Cedar River region; infrequent.

204. *S. Aruncus*, L. Goat's-Beard.
Rich soil at Wild Cat Den and Wyoming Hill.

Physocarpus, Maxim.

205. *P. opulifolius*, Maxim. Nine-bark.
Moist places in hilly woods; not frequent.

Rubus, Tourn. Bramble.

206. *R. occidentalis*, L. Black Raspberry.
Fence-rows and open woods; common.

207. *R. villosus*, Ait. High Blackberry.
Borders of woods, open thickets, etc.; common.

208. *R. Canadensis*, L. Dewberry.
Dry fields and borders of woods; frequent.

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209. *R. cuneifolius*, Pursh. Sand Blackberry.
Dry sterile hillside, Wild Cat Den.

Geum, L. Avens.

210. *G. album*, Gmelin.
Borders of woods; common.

211. *G. Virginianum*, L.
Low grounds; rather common.

Fragaria, Tourn. Strawberry.

212. *F. Virginiana*, Mill., var. *Illinoensis*, Gray.
Meadows, fence-rows, etc. Common.

213. *F. vesca*, L.
Rocky soil at Wild Cat Den. Our plant is *Fragaria Americana* (Porter) Britton.

Potentilla, L. Cinque-foil. Five-finger.

214. *P. arguta*, Pursh.
Dry soil; not common.

215. *P. Norvegica*, L.
Moist rich soil; common.

216. *P. rivalis*, Nutt., var. *pentandra*, Watson.
Sandy soil near Salisbury Bridge, Muscatine county. Davenport (A. S. Hitchcock in Cat. of *Anthophyta* and *Pteridophyta* of Ames, Iowa).

217. *P. Canadensis*, L.
Dry soil; common.

Agrimonia, Tourn. Agrimony.

218. *A. Eupatoria*, L.
Borders of woods; common.

219. *A. parviflora*, Ait.
Moist woods at Wild Cat Den. Along Cedar River.

Rosa, Tourn.

220. *R. blanda*, Ait.
Borders of woods and banks of streams; rather rare.

221. *R. Arkansana*, Porter.
Eroded hills and dry soils; common.

222. **R. rubiginosa**, L. Sweet-brier.
Escaped at Muscatine, Blue Grass, and Le Claire.

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Pyrus, L.

223. *P. Ioensis*, Bailey.
Common in open woods. Typical *Pyrus coronaria*, L., has not yet been found within our limits.

224. *P. Americana*, DC. American Mountain Ash.
Three or four small trees in woods near Low's Run, Muscatine county.

Cratægus, L. Hawthorn.

225. *C. coccinea*, var. *flabellata*, (Spach), Britton.
Open woods; common. Often mistaken for the type.

226. *O. coccinea*, var. *macracantha*, Dudley.
Infrequent; Wyoming Hill.

227. *C. coccinea*, var. *mollis*, Torr. & Gray.
Open woods; common. Our species of this genus are all found in open woods and thickets.

228. *C. tomentosa*, L.
Infrequent.

229. *C. punctata*, Jacq.
Walnut Grove, Scott county; Muscatine.

230. *C. crus-galli*, L.
Frequent. On May 15, 1895, four species of *Cratægus* were observed in the woods at Walnut Grove, Scott county. *C. coccinea*, var. *mollis*, had small haws already formed; var. *flabellata* had lost all but a few petals, *C. crus-galli* was in full bloom and *C. tomentosa* had begun to show white in the bud. *C. punctata* blooms with *C. tomentosa*. This sequence of inflorescence appears constant, the intervals between succeeding species being about a week.

Amelanchier, Medic.

231. *A Canadensis*, Torr. & Gray. Service-berry.
Woodlands of Muscatine county; frequent

SAXIFRAGACEÆ.

Saxifraga, L.

232. *S. Pennsylvanica*, L. Saxifrage.
Low wet places; common.

Mitella, Tourn.

233. *M. diphylla*, L. Bishop's Cap.
Rich wooded hillsides; infrequent.

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Heuchera, L.

234. *H. hispida*, Pursh. Alum-root.
Dry soil; common.

Parnassia, Tourn.

235. *P. Caroliniana*, Michx. Grass of Parnassus.
Boggy places in the Cedar River region. Wet meadows at Eldridge.

Ribes, L. Currant. Gooseberry.

236. *R. Cynosbati*, L.
Woods; less frequent than the next.

237. *R. gracile*, Michx. Missouri Gooseberry.
Woods; frequent.

238. *R. floridum*, L'Her. Wild Black Currant.
Rich woods; frequent.

239. *R. aureum*, Pursh. Buffalo Currant.
Escaped to roadside near Blue Grass.

CRASSULACEÆ.

Penthorum, Gronov.

240. *P. sedoides*, L. Ditch Stone-crop.
Ditches and other wet places; common.

Sedum, Tourn. Stone-crop. Orpine.

241. *S. telephioides*, Michx.
Near old dwellings and cemeteries.

242. **S. Telephium**, L. Live-for-ever.
Habitat same as that of the last; less frequent.

HALORAGEÆ.

Myriophyllum, Vaill. Water Milfoil.

243. *M. spicatum*, L.
Pond near Salisbury Bridge in the Cedar River region, growing in water three or four feet deep.

244. *M. scabratum*, Michx.
Shallow ponds on Muscatine Island, Muscatine county; not infrequent.

Proserpinaca, L.

245. *P. palustris*, L. Mermaid-weed.
Borders of ponds along Cedar River; not common.

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Callitriche, L.

246. *C. verna*, L. Water Starwort.
Stagnant slough near Cedar River in the vicinity of Salisbury Bridge.

MELASTOMACEÆ.

Rhexia, L

247. *R. Virginica*, L. Meadow Beauty.
In a wet depression on the sand hills of Cedar River, Lake T'w'p., Muscatine county; rare.

LYTHRACEÆ.

Didiplis, Raf.

248. *D. linearis*, Raf. Water Purslane.
Bottom of shallow pond near Noels.

Rotala, L.

249. *R. ramosior*, Koehne.
Borders of ponds; frequent.

Ammania, Houston.

250. *A. coccinea*, Rottb.
Low wet ground; frequent.

Lythrum, L.

251. *L. alatum*, Pursh. Loosestrife.
Low wet grounds; common.

ONAGRACEÆ.

Ludwigia, L.

252. *L. alternifolia*, L. Seed-box.
Borders of ponds; infrequent.

253. *L. polycarpa*, Short & Peter.
Ditches; frequent.

254. *L. palustris*, Ell.
In mud and water of shallow ponds, etc.; frequent.

Epilobium, L.

255. *E. coloratum*, Muhl. Willow-herb.
Wet grounds; common.

Œnothera, L. Evening Primrose.

256. *Œ. biennis*, L.
Fields and waste places; common.

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257. *Œ. biennis*, L., var. *grandiflora*, Lindl.
Roadsides and waste places; infrequent.

258. *Œ. rhombipetala*, Nutt.
Sandy soil along Cedar and Wapsipinicon Rivers; common.

259. *Œ. sinuata*, L.
Near the Rolling Mills, Muscatine.

260. *Œ. fruticosa*, L. Sundrops.
Sandy soil of the Cedar River region; Eldridge. Rare.

Gaura, L.

261. *G. biennis*, L.
River banks and waste places; common.

262. *G. parviflora*, Dougl.
Front Street, Muscatine.

Circæa, Tourn. Enchanter's Nightshade.

263. *C. Lutetiana*, L.
Rich woods; common.

264. *C. alpina*, L.
In springy soil under cool dripping rocks at Wild Cat Den. Rare.

CUCURBITACEÆ.

Sicyos, L.

265. *S. angulatus*, L. One-seeded Burr Cucumber.
River banks; common.

Echinocystis, Torr. & Gray.

266. *E. lobata*, Torr. & Gray.
River banks; common.

Cucurbita, L.

267. *C. fœtidissima*, HBK.
Railroad track near Muscatine; one plant in 1898.

CACTACEÆ.

Opuntia, Tourn.

268. *O. Rafinesquii*, Engelm. Prickly Pear.
Sandy soil along Cedar River in the vicinity of Moscow and the B. C. R. & N. Railroad Bridge; infrequent.

FICOIDEÆ.

Mollugo, L.

269. **M. verticillata**, L. Carpet-weed
Sandy river banks and waste places; common.

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UMBELLIFERÆ.

Daucus, Tourn.

270. **D. Carota**, L. Carrot.
Roadsides; infrequent.

Angelica, L.

271. *A. atropurpurea*, L.
Moist hillside near Low's Run, Muscatine Co. (Mackenzie).

Tiedemannia, DC.

272. *T. rigida*, Coult & Rose. Cowbane.
Swampy ground; infrequent.

Pastinaca, L.

273. **P. sativa**, L.
Waste places; common.

Polytænia, DC.

274. *P. Nuttallii*, DC.
Dry sterile soil; not frequent.

Fœniculum, Adans.

275. **F. officinale**, All. Fennel.
Marshy ground in West Davenport.

Pimpinella, L.

276. *P. integerrima*, Benth. & Hook.
Rocky hillsides, West Davenport; McCausland; Wilton branch of the C. R. I. & P. near Muscatine.

Cryptotænia, DC.

277. *C. Canadensis*, DC.
Moist woods; infrequent.

Sium, Tourn.

278. *S. cicutæfolium*, Gmelin.
Swampy places; frequent.

Zizia, Koch.

279. *Z. aurea*, Koch.
Prairies; frequent. Blooms in April and May.

Cicuta, L. Water Hemlock.

280. *C. maculata*, L.
Sloughs; common.

281. *C. bulbifera*, L.
McCloud's Spring, near Bayfield, Muscatine county.

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Leptocaulis, Nutt.

282. *L. patens*, Nutt.
Sandy railroad embankment near Montpelier.

Chærophyllum, L.

283. *C. procumbens*, Crantz.
Moscow; infrequent.

Osmorrhiza, Raf. Sweet Cicely.

284. *O. brevistylis*, DC.
Rich woods; common.

285. *O. longistylis*, DC.
With the preceding species.

Eryngium, Tourn.

286. *E. yuccæfolium*, Michx. Rattlesnake Master.
Prairies; common.

Sanicula, Tourn.

287. *S. Marilandica*, L. Black Snakeroot.
Woods; common.

ARALIACEÆ.

Aralia, Tourn.

288. *A. racemosa*, L. Spikenard.
Rich woodlands; infrequent.

289. *A. nudicaulis*, L. Wild Sarsaparilla.
Moist rich woods at Wild Cat Den.

290. *A. quinquefolia*, Descne. & Planch. Ginseng.
Rich woods; infrequent.

CORNACEÆ.

Cornus, Tourn. Cornel. Dogwood.

291. *C. circinata*, L'Her.
Rocky woods along Sweetland Creek (Mackenzie).

292. *C. sericea*, L. Kinnikinnik.
Wet places; not frequent.

293. *C. asperifolia*, Michx.
Dry soil; frequent.

294. *C. stolonifera*, Michx. Red-Osier Dogwood.
Wet places; infrequent.

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295. *C. paniculata*, L'Her.
Open woods; common.

296. *C. alternifolia*, L. f.
Woods; infrequent.

CAPRIFOLIACEÆ.

Sambucus, Tourn.

297. *S. Canadensis*, L. Elder.
Open woods; frequent.

Viburnum, L.

298. *V. Lentago*, L. Sheep-berry.
Woods and banks of streams; infrequent.

Triosteum, L.

299. *T. perfoliatum*, L. Fever-wort. Horse Gentian.
Woods; frequent.

Symphoricarpus, Dill.

300. *S. vulgaris*, Michx. Coral-berry.
Dry bank on border of woods above Muscatine; infrequent.

Lonicera, L.

301. *L. glauca*, Hill.
Woods; infrequent.

Diervilla, Tourn.

302. *D. trifida*, Moench.
Woods; infrequent.

RUBIACEÆ.

Houstonia, L.

303. *H. minima*, Beck.
Dry sandy soil along Cedar and Wapsipinicon Rivers; Camp McClellan, near Davenport. Very abundant locally.

Cephalanthus, L.

304. *C. occidentalis*, L. Button-bush.
Swampy grounds and river banks.

Galium, L. Bedstraw. Cleavers.

305. *C. Aparine*, L.
Moist woods; frequent.

306. *G. circæzans*, Michx.
Rich woods; not common.

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307. *G. trifidum*, L., var. *latifolium*, Torr.
Low wet grounds; common.

308. *G. asprellum*, Michx.
Woods; common.

309. *G. triflorum*, Michx.
Moist woods; not common.

VALERIANACEÆ.

Valeriana, Tourn.

310. *V. edulis*, Nutt. Valerian.
Wet prairies near Maysville and Eldridge; rare.

COMPOSITÆ.

Vernonia, Schreb. Iron-weed.

311. *V. fasciculata*, Michx.
Low grounds; common. In Lake T'w'p., Muscatine county, there is a white-flowered form of this species.

312. *V. altissima*, Nutt., var. *grandiflora*, Nutt.
Near Davenport; rare.

Eupatorium, Tourn. Thoroughwort.

313. *E. purpureum*, L. Joe-Pye Weed.
Low grounds; frequent.

314. *E. serotinum*, Michx.
Low grounds; common.

315. *E. altissimum*, L.
Dry soil; infrequent.

316. *E. perfoliatum*, L. Boneset.
Low grounds; common.

317. *E. ageratoides*, L. White Snake-root.
Rich woods; common.

Kuhnia, L.

318. *K. eupatorioides*, L.
Dry soil; common.

Liatris, Schreb. Blazing Star.

319. *L. cylindracea*, Michx.
Sandy prairies; infrequent.

320. *L. scariosa*, Willd.
Dry soil; common.

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321. *L. pycnostachya*, Michx.
Dry soil; common.

Grindelia, Willd.

322. *G. squarrosa*, Dunal.
Railroad tracks, Fruitland, 1894; Wilton, 1895. Evidently of recent introduction.

Chrysopsis, Nutt.

323. *C. villosa*, Nutt. Golden Aster.
Sandy soil near Wapsipinicon River.

Solidago, L. Golden-rod.

324. *S. latifolia*, L.
Moist wooded hillsides; frequent.

325. *S. speciosa*, Nutt.
Dry soils, borders of woods and along railroads; frequent.

326. *S. speciosa*, Nutt., var. *angustata*, Torr. & Gray.
West Davenport; Muscatine.

327. *S. patula*, Muhl.
Boggy places along Cedar River; infrequent.

328. *S. ulmifolia*, Muhl.
Hilly woodlands; frequent.

329. *S. Missouriensis*, Nutt.
Dry prairies; frequent. Our earliest goldenrod.

330. *S. serotina*, Ait.
Open woods and dry banks; frequent.

331. *S. serotina*, Ait., var. *gigantea*, Gray.
Not frequent.

332. *S. Canadensis*, L.
Borders of woods and fence-rows; common.

333. *S. nemoralis*, Ait.
Dry sterile soil; frequent.

334. *S. rigida*, L.
Prairies and dry banks; frequent.

335. *S. Riddellii*, Frank.
Wet prairies, Cedar River region; Eldridge.

336. *S. lanceolata*, L.
Low grounds; common.

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Boltonia, L'Her.

337. *B. asteroides*, L'Her.
Low wet places; abundant locally.

Aster, L.

338. *A. corymbosus*, Ait.
Woods; infrequent.

339. *A. macrophyllus*, L.
Moist woodlands; not infrequent.

340. *A. oblongifolius*, Nutt., var. *rigidulus*, Gray.
Dry sandy soil; Cedar River region, Muscatine Island, and Wyoming Hill; Mississippi River near Camp McClellan.

341. *A. Novae Angliæ*, L.
Moist grounds; common. An albino of this species is frequent along several miles of roadside near Fairport.

342. *A. Novae Angliæ*, L., var. *roseus*, Gray.
Infrequent.

343. *A. sericeus*, Vent.
Dry sandy soil; frequent.

344. *A. azureus*, Lindl.
Prairies; frequent.

345. *A. Shortii*, Hook.
Dry banks and borders of woods; frequent.

346. *A. cordifolius*, L.
Hilly woods, T'w'p. Seventy-six, Muscatine county. Not common. Frequent at Drury's Landing, Ill., just outside of our limits.

347. *A. sagittifolius*, Willd.
Open woods; common.

348. *A. Drummondii*, Lindl.
Open woods; frequent. When not growing with *A. sagittifolius*, quite distinct, frequently four or five feet high and of more vigorous growth than that species.

349. *A. lævis*, L.
Dry prairies; frequent.

350. *A. ericoides*, L.
Dry soil; frequent.

351. *A. ericoides*, L., var. *villosus*, Torr. & Gray.
Rocky banks of the Mississippi; frequent.

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352. *A. amethystinus*, Nutt.
Roadsides, Blue Grass; rare.

353. *A. multiflorus*, Ait.
Dry soil in waste places; common.

354. *A. vimineus*, Lam.
Damp, open grounds; frequent.

355. *A. diffusus*, Ait.
Open woods and thickets; frequent.

356. *A. diffusus*, Ait., var. *thyrsoideus*, Gray.
Roadsides; infrequent.

357. *A. diffusus*, Ait., var. *bifrons*, Gray.
Low grounds and shady places; frequent.

358. *A. diffusus*, Ait, var. *hirsuticaulis*, Gray.
Roadsides; common. This Aster seems to be midway between the varieties *hirsuticaulis*, Gray, and *pendulus* (Ait.) Burgess.—*E. J. Hill*

359. *A. Tradescanti*, L.
Frequent in low grounds.

360. *A. paniculatus*, Lam.
Common.

361. *A. paniculatus*, Lam., var. *bellidiflorus*, Britton.
Damp soil; frequent.

362. *A. salicifolius*, Ait.
Open woods; frequent.

363. *A. salicifolius*, Ait., var. *subasper*, Gray.
Blue Grass.

364. *A. prenanthoides*, Muhl.
Damp woods at Wild Cat Den.

365. *A. puniceus*, L.
Damp places; common.

366. *A. puniceus*, L., var. *lucidulus*, Gray.
With the type; infrequent.

367. *A. umbellatus*, Mill.
Moist ground, Allen's Grove and Cedar River region.

368. *A. linariifolius*, L.
Dry sandy soil, Bayfield.

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369. *A. ptarmicoides*, Torr. & Gray.
Dry sandy prairie, Bayfield.

Erigeron, L. Fleabane.

370. *E. Canadensis*, L. Butter-weed.
Waste grounds; common.

371. *E. divaricatus*, Michx.
Dry sandy soil, Cedar River region; frequent. Becoming a troublesome weed in pastures in Scott county.

372. *E. annuus*, Pers. Daisy Fleabane.
Fields and waste places; frequent.

373. *E. strigosus*, Muhl.
Similar places; common.

374. *E. bellidifolius*, Muhl.
Woods; frequent.

375. *E. Philadelphicus*, L.
Moist ground; frequent.

Antennaria, Gaertn.

376. *A. plantaginifolia*, Hook. Plantain-leaved Everlasting.
Dry sterile soil; common.

Gnaphalium, L.

377. *G. polycephalum*, Michx.
Dry fields and open woods; frequent.

Polymnia, L.

378. *P. Canadensis*, L., var. *radiata*, Gray. Leaf Cup.
Open rich woods along Cedar River; not infrequent.

Silphium, L. Rosin-weed.

379. *S. laciniatum*, L. Compass Plant.
Prairies; common.

380. *S. integrifolium*, Michx.
Prairies; common.

381. *S. perfoliatum*, L. Cup Plant.
Low grounds; frequent.

Parthenium, L.

382. *P. integrifolium*, L.
Dry sandy soil; infrequent.

Iva, L.

383. *I. xanthiifolia*, Nutt.
Dry waste grounds, Muscatine, Davenport.

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Ambrosia, Tourn. Ragweed.

384. *A. trifida*, L.
Fields and waste places; common.

385. *A. trifida*, L., var. *integrifolia*, Torr. & Gray.
Frequent.

386. *A. artemisiæfolia*, L.
Fields and waste places; common.

387. *A. psilostachya*, DC.
Dry sandy soil; abundant locally.

Xanthium, Tourn. Cockleburr.

388. **X. strumarium**, L.
River banks, West Davenport; frequent.

389. *X. Canadense*, Mill.
Fields and waste places; common. Abundant along rivers.

390. *X. Canadense*, Mill, var. *echinatum*, Gray.
River bank at West Davenport, Rockingham, and Muscatine; infrequent.

Eclipta, L.

391. *E. alba*, Hassk.
River banks; common.

Heliopsis, Pers.

392. *H. lævis*, Pers.
Roadsides; infrequent in Scott; frequent in Muscatine.

393. *H. scabra*, Dunal.
Roadsides and waste places; common.

Echinacea, Moench.

394. *E. purpurea*, Moench.
Collected in Louisa county, just outside our limits, in 1891.

395. *E. angustifolia*, DC.
Dry prairies; common.

Rudbeckia, L. Cone-flower.

396. *R. laciniata*, L.
Along streams; rather common.

397. *R. triloba*, L.
Dry soil; frequent.

398. *R. subtomentosa*, Pursch.
Low prairies; frequent.

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399. *R. hirta*. L.
Dry soil; common.

Lepachys, Raf.

400. *L. pinnata*, Torr. & Gray.
Prairies and dry banks; common.

401. *L. columnaris*, Torr & Gray.
Railroad track, Blue Grass, 1896; Muscatine; infrequent.

Helianthus, L.

402. *H. annuus*, L.
Railroad tracks and waste places; frequent.

403. *H. petiolaris*, Nutt.
Frequent along railroad track from Fruitland to Montpelier.

404. *H. rigidus*, Desf.
Dry grounds; common.

405. *H. lætiflorus*, Pers.
Dry open places; frequent.

406. *H. occidentalis*, Riddell.
Dry sterile soil; frequent.

407. *H. mollis*, Lam.
Waste ground near railroad track, Muscatine.

408. *H. grosse-serratus*, Martens.
Low grounds and roadsides; common.

409. *H. giganteus*, L.
Open woodlands, Muscatine, Pine Mill, Moscow.

410. *H. strumosus*, L.
Borders of woods.

411. *H. strumosus*, L., var. *mollis*, Torr. & Gray.
Fence rows, etc.; frequent.

412. *H. tracheliifolius*, Willd.
Borders of woods in sandy soil; infrequent.

413. *H. decapetalus*, L.
Frequent.

414. *H. tuberosus*, L. Jerusalem Artichoke.
Dry grounds and fence rows; common.

415. *H. tuberosus*, L., var. *subcanescens*, Gray.
Dry soil, Blue Grass, Cedar River region.

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Actinomeris, Nutt.

416. *A. squarrosa*, Nutt.
Borders of woods, Muscatine county; infrequent. Near Davenport.

Coreopsis, L. Tickseed.

417. *C. tinctoria*, Nutt.
Escaped from cultivation near Fruitland. (Mackenzie.)

418. *C. palmata*, Nutt.
Dry hillsides and prairies; common.

419. *C. tripteris*, L. Tall Coreopsis.
Frequent in vicinity of Cedar River; infrequent elsewhere.

420. *C. trichosperma*, Michx. Tickseed Sunflower.
Low grounds; wet meadows; frequent.

421. *C. trichosperma*, Michx., var. *tenuiloba*.
Maysville, Scott county, 1896.

422. *C. aristosa*, Michx., var. *mutica*.
Low grounds near Wilton and Atalissa.

423. *C. involucrata*, Nutt.
Low grounds near Walcott.

424. *C. discoidea*, Torr. & Gray.
In low wet ground, West Davenport.

Bidens, L. Burr Marigold.

425. *B. frondosa*, L.
Moist waste places; very common.

426. *B. connata*, Muhl.
Infrequent in swampy grounds, West Davenport.

427. *B. connata*, Muhl., var. *comosa*, Gray.
Moist waste places; common.

428. *B. cernua*, L.
Low wet grounds; frequent.

Galinsoga, Ruiz & Pavon.

429. **G. parviflora**, Cav.
Streets of Northwest Davenport near Fair Grounds. Abundant over a limited area.

Helenium, L.

430. *H. autumnale*, L.
River banks and low ground; common.

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Dysodia, Cav.

431. *D. chrysanthemoides*, Lag.
Dry sterile soil; frequent.

Anthemis, L. Chamomile.

432. **A. Cotula**, DC. Dog Fennel. Mayweed.
Roadsides and waste grounds; common.

433. **A. arvensis**, L. Corn Chamomile.
Waste ground, Muscatine; infrequent.

Achillæa, L.

434. *A. Millefolium*, L. Yarrow.
Fields, etc.; common. The rose-colored form is infrequent.

Chrysanthemum, Tourn.

435. **C. Leucanthemum**, L. Ox-eye Daisy.
Railroad tracks at West Davenport, Blue Grass, and Muscatine Island.

Tanacetum, L.

436. **T. vulgare**, L.
Roadsides near old gardens; frequent.

Artemisia, L. Wormwood.

437. *A. caudata*, Michx.
Dry sandy soil, Cedar River region; common.

438. *A. dracunculoides*, Pursh.
Dry soil; infrequent.

439. **A. Abrotinum**, L.
Near old gardens; not frequent.

440. *A. serrata*, Nutt.
Sandy banks of streams, etc.; frequent.

441. *A. Ludoviciana*, Nutt.
Dry ground; common.

442. *A. biennis*, Willd.
Waste grounds; common.

443. **A. annua**, L.
Streets and waste grounds of Davenport and Muscatine.

Senecio, Tourn.

444. *S. aureus*, L. Golden Ragwort.
Boggy place at Wild Cat Den; rare.

445. *S. aureus*, L., var. *Balsamitæ*, Torr. & Gray.
Dry prairies; common.

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Cacalia, L. Indian Plantain.

446. *C. suaveolens*, L.
Banks of creeks along Cedar River; infrequent.

447. *C. reniformis*, Muhl.
Wild Cat Den; Cedar T'w'p.; rare.

448. *C. atriplicifolia*, L.
Borders of woods; frequent.

449. *C. tuberosa*, Nutt.
Wet prairies; common.

Erechtites, Raf.

450. *E. hieracifolia*, Raf. Fireweed.
Moist woods and waste places; common.

Arctium, L. Burdock.

451. **A. Lappa**, L.
Waste places; common.

452. **A. Lappa**, L., var. **majus**, Gray.
Eldridge; apparently rare.

Cnicus, Tourn.

453. **C. lanceolatus**, Hoffm.
Pastures and waste places; common.

454. *C. undulatus*, Gray.
Railroad track near Montpelier; a single plant.

455. *C. altissimus*, Willd.
Fields and open woods; infrequent.

456. *C. altissimus*, Willd., var. *discolor*, Gray.
Common.

457. *C. Hillii*, Canby. Garden and Forest, March 4, 1891
Dry prairies, pastures and open woodlands; infrequent. Although found in various localities within our limits, it seems to be most frequent in dry sandy soil along Cedar and Wapsipinicon Rivers. See plate and description.

458. **C. arvensis**, Hoffm. Canada Thistle.
Muscatine, Moscow, Valley City; rare.

Krigia, Schreber.

459. *K. amplexicaulis*, Nutt.
Rich woods; infrequent.

Cichorium, Tourn. Chicory.

460. **C. Intybus**, L.
Roadsides; frequent.

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Hieracium, Tourn. Hawkweed.

461. *H. Canadense*, Michx.
Dry wooded hillsides; infrequent.

462. *H. scabrum*, Michx.
Dry woodlands; infrequent.

463. *H. longipilum*, Torr.
Sandy prairie near Bayfield Station; not frequent.

Prenanthes, Vaill. Rattlesnake Root.

464 *P. racemosa*, Michx.
Prairies and along railroads; frequent.

465. *P. aspera*, Michx.
Prairies, etc.; frequent.

466. *P. alba*, L.
Borders of woods; infrequent.

Troximon, Nutt.

467. *T. cuspidatum*, Pursh.
Dry prairie near Blue Grass. Lake T'w'p., near Cedar River, May, 1893. (Mackenzie.)

Taraxacum, Haller.

468. **T. officinale**, Weber. Dandelion.
Fields, etc.; common.

Lactuca, Tourn. Lettuce.

469. **L. Scariola**, L. Prickly Lettuce.
Railroad tracks and waste places; becoming common.

470. *L. Canadensis*, L.
Rich soil; common.

471. *L. Ludoviciana*, DC.
Rich soil; infrequent.

472. *L. Floridana*, Gaertn.
Borders of woods; frequent.

473 *L. leucophæa*, Gray.
Borders of woods in rich soil, Dixon, Blue Grass, Davenport, Pine Creek.

Sonchus, L. Sow Thistle.

474. **S. oleraceus**, L.
Waste places; common.

475. **S. asper**, Vill.
With the last species; infrequent.

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LOBELIACEÆ.

Lobelia, L.

476 *L. cardinalis*, L. Cardinal Flower.
Low grounds along rivers; frequent.

477. *L. syphilitica*, L.
Low grounds, common. White-flowered forms are occasionally met with.

478. *L. spicata*, Lam.
Prairies; infrequent.

479. *L. inflata*, L. Indian Tobacco.
Dry woods; common.

CAMPANULACEÆ.

Specularia, Heister.

480. *S. perfoliata*, A. DC. Venus's Looking-glass.
Dry banks and fields; frequent.

Campanula, Tourn. Bellflower.

481. *C. aparinoides*, Pursh.
Moist grounds; frequent in Muscatine county.

482. *C. Americana*, L.
Moist open woods; frequent.

ERICACEÆ.

Gaylussacia, HBK.

483. *G. resinosa*, Torr. & Gray. Black Huckleberry.
Dry sterile soil at Wild Cat Den and along Duck Creek.

Pyrola, Tourn. Shinleaf.

484. *P. elliptica*, Nutt.
Hillsides, Allen's Grove; Lake T'w'p., near Cedar River; Seventy-six T'w'p.; infrequent.

Monotropa, L.

485. *M. uniflora*, L. Indian Pipe. Corpse Plant.
Rich woods, Wyoming Hill, 1878; Allen's Grove, 1892; near Cedar River, 1895 (Witter); rare.

PRIMULACEÆ.

Dodecatheon, L.

486. *D. Meadia*, L. Shooting Star.
Prairies; common.

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Androsace, Tourn.

487. *A. occidentalis*, Pursh.
Dry sterile soil along Cedar and Wapsipinicon Rivers; Camp McClellan. Abundant locally.

Steironema, Raf.

488. *S. ciliatum*, Raf.
Low grounds; common.

489. *S. lanceolatum*, Gray.
Low grounds; frequent.

490. *S. longifolium*, Gray.
Moist prairies; common.

Lysimachia, Tourn. Loosestrife.

491. *L. stricta*, Ait.
Low grounds at Montpelier, Noels, and Muscatine. Now rare or extinct.

492 **L. nummularia**, L. Moneywort.
Sparingly escaped from cultivation; Muscatine, Le Claire.

493. *L. thyrsiflora*, L.
Swampy grounds, Moscow, Muscatine Island, Eldridge. Probably extinct in these localities. Islands opposite Montpelier and bank of river near Buffalo; frequent.

OLEACEÆ.

Fraxinus, Tourn. Ash.

494. *F. Americana*, L. White Ash.
River banks and woods; frequent.

495. *F. pubescens*, Lam. Red Ash.
River banks; infrequent.

496. *F. viridis*, Michx. f. Green Ash.
River banks; common.

497. *F. sambucifolia*, Lam. Black Ash.
Jamestown, Blue Grass, Wild Cat Den, Cedar T'w'p.; infrequent.

APOCYNACEÆ.

Apocynum, Tourn. Dogbane.

498. *A. androsæmifolium*, L.
Borders of woods; infrequent.

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499. *A. cannabinum*, L.
Moist or dry soil; frequent.

ASCLEPIADACEÆ.

Asclepias, L. Milkweed. Silkweed.

500. *A. tuberosa*, L. Butterfly-weed. Pleurisy-root.
Dry prairies; common.

501. *A purpurascens*, L.
Along railroads; not common. Dry hillside near Wild Cat Den.

502. *A. incarnata*, L.
Low wet grounds; common.

503. *A. Cornuti*, Decaisne.
Fields and waste places; common.

504. *A. Sullivantii*, Engelm.
Prairies; infrequent.

505. *A. obtusifolia*, Michx,
Sandy soil; frequent.

506. *A. phytolaccoides*, Pursh.
Moist woods of Muscatine county; not rare.

507. *A. quadrifolia*, L.
Dry woods; rare. Wild Cat Den, Weed's Woods, and T'w'p. Seventy-six of Muscatine county.

508. *A. verticillata*, L.
Dry prairies; common.

Acerates, Ell. Green Milkweed.

509. *A. longifolia*, Ell.
Prairies and roadsides; common.

510. *A. viridiflora*, Ell.
Dry prairies; common.

GENTIANACEÆ.

Gentiana, Tourn. Gentian.

511. *G. crinita*, Froel.
Boggy ravine, Lake T'w'p., and Cedar River region in Muscatine county.

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512. *G. quinqueflora*, Lam., var. *occidentalis*, Gray.
Moist hillsides; frequent.

513. *G. puberula*, Michx.
Prairies and barren places; not rare. Muscatine county.

514. *G. Andrewsii*, Griseb. Closed G.
Low places; infrequent.

515. *G. alba*, Muhl.
Moist wooded banks and copses; frequent. Muscatine Co.

POLEMONIACEÆ.

Phlox, L.

516. *P. paniculata*, L.
Established near old gardens in Scott county.

517. *P. maculata*, L. Wild Sweet William.
Railroad tracks; infrequent. Eldridge, Noels. Abundant near Allen's Grove, where an albino occurs.

518. *P. pilosa*, L.
Prairies and dry open woods; common.

519. *P. divaricata*, L.
Woods; common.

520. *P. bifida*, Beck.
Sandy open woods along Cedar River near Moscow, Muscatine county; local.

Polemonium, Tourn.

521. *P. reptans*, L. Greek Valerian.
Woods; frequent.

HYDROPHYLLACEÆ.

Hydrophyllum, Tourn.

522. *H. Virginicum*, L.
Rich woods; frequent.

523. *H. appendiculatum*, Michx.
Damp rich woods near streams; infrequent. Muscatine Co.

Ellisia, L.

524. *E. Nyctelea*, L.
Moist woods; frequent.

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BORRAGINACEÆ.

Cynoglossum, Tourn.

525. **C. officinale,** L. Hound's Tongue.
Dry soil; rather infrequent.

Echinospermum, Lehm. Stickseed.

526. *E. Virginicum,* Lehm. Beggar's Lice.
Open woods; common.

527. **E. Lappula,** Lehm.
Dry soil; infrequent. Abundant in the streets of Le Claire and in Camp McClellan.

Mertensia, Roth.

528. *M. Virginica,* DC. Blue Bells.
Rich woods; frequent.

Myosotis, Dill. Forget-me-not.

529. *M. verna,* Nutt.
Sandy soil along Wapsipinicon and Cedar Rivers; infrequent.

Lithospermum, Tourn. Puccoon.

530. **L. arvense,** L.
On railroad near Fairport.

531. *L. hirtum,* Lehm.
Dry sandy hills; infrequent. Cedar and Wapsipinicon River regions.

532. *L. canescens,* Lehm.
Prairies; common.

533. *L. angustifolium,* Michx.
Dry sandy hills; infrequent. River regions of Cedar and Wapsipinicon, with *L. hirtum.* Rocky banks of Mississippi near Camp McClellan.

Onosmodium, Michx.

534. *O. Carolinianum,* DC., var. *molle,* Gray.
Sandy ground; infrequent.

CONVOLVULACEÆ.

Ipomœa, L. Morning Glory.

535. *I. coccinea,* L.
Spontaneous near an old garden, Blue Grass, Scott county.

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536. **I. hederacea**, Jacq.
River bank near Buffalo, Scott county.

537. **I. purpurea**, Lam. Common M.
Frequently escaping from old gardens.

538. *I. pandurata*, Meyer. Man-of-the-Earth.
Eroded hills and dry river banks; infrequent.

539. *I. lacunosa*, L.
Islands and banks of the Mississippi; frequent.

Convolvulus, Tourn. Bindweed.

540. *C. spithamæus*, L.
Dry soil, Jamestown, Wild Cat Den, Low's Run; rare.

541. *C. sepium*, L.
Cultivated and waste grounds; common.

542. *C. sepium*, L., var. *repens*, Gray.
Devil's Glen, Scott county; rare.

543. **C. arvensis**, L.
Cultivated and waste grounds; becoming as troublesome in some localities as *C. sepium*.

Breweria, R. B.

544. *B. Pickeringii*, Gray.
Sandy soil along railroad at Fruitland; local.

Cuscuta, Tourn. Dodder.

545. *C. chlorocarpa*, Engelm.
Low grounds along streams; common. Often growing on *Xanthium* and low willows.

546. *C. tenuiflora*, Engelm.
On willows, *Compositæ*, and *Cephalanthus*; frequent.

547. *C. inflexa*, Engelm.
On *Compositæ* and hazel; infrequent.

548. *C. Gronovii*, Willd.
Low grounds; infrequent. On *Compositæ*.

549. *C. cuspidata*, Engelm.
Sandy prairies near Fruitland. On Ambrosia, Erigeron, and Verbena, Sept., 1895, Sept., 1898.

550. *C. glomerata*, Choisy.
Low grounds; frequent. On tall *Compositæ*.

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SOLANACEÆ.

Solanum, Tourn. Nightshade.

551. **S. Dulcamara**, L. Bittersweet.
Waste places near old dwellings; infrequent.

552. *S. nigrum*, L.
Shaded grounds; common.

553. *S. Carolinense*, L. Horse Nettle.
Dry sandy soil; frequent.

554. *S. rostratum*, Dunal.
Becoming frequent along railroad tracks. The first plants within our limits were found in 1891.

Physalis, L. Ground Cherry.

555. *P. Philadelphica*, Lam.
Along river banks and railroad tracks; infrequent.

556. *P. pubescens*, L.
Rich soil; common.

557. *P. lanceolata*, Michx.
Railroads and waste places; common.

Nicandra, Adans.

558. **N. physaloides**, Gaertn. Apple of Peru.
Escaped into a field near Muscatine, 1896.

Lycium, L.

559. **L. vulgare**, Dunal. Matrimony Vine.
Near old gardens; common.

Datura, D. Jamestown Weed. "Jimsonweed."

560. **D. Stamonium**, L.
Waste places; common in Muscatine county; infrequent in Scott county.

561. **D. Tatula**, L.
Waste places; common in both counties.

SCROPHULARIACEÆ.

Verbascum, L. Mullein.

562. **V. Thapsus**, L. Common Mullein.
Waste places; common.

563. **V. Blattaria**, L. Moth Mullein.
Woodland pastures, Muscatine county; infrequent.

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Linaria, Tourn.

564. **L. vulgaris**, Mill. Butter and Eggs.
Roadsides and railroad tracks; frequent.

Scrophularia, Tourn. Figwort.

565. *S. nodosa*, L., var. *Marilandica*, Gray.
Woods and waste places; common.

Chelone, Tourn. Turtle Head. Snake Head.

566. *C. glabra*, L.
Boggy places, Muscatine county; infrequent.

567. *C. obliqua*, L. Purple Turtle Head.
Along Muscatine slough; infrequent.

Penstemon, Mitchell. Beard-tongue.

568. *P. pubescens*, Solander.
Dry sandy soil; frequent.

569. *P. lævigatus*, Solander, var. *Digitalis*, Gray.
Frequent in Cedar River region; infrequent elsewhere.

570. *P. grandiflorus*, Nutt.
Sandy soil; not rare, but confined to a limited area in Muscatine Island and Cedar River region.

Mimulus, L.

571. *M. ringens*, L. Monkey Flower.
Wet places; common.

Conobea, Aublet.

572. *C. multifida*, Benth.
Sandy soil, banks of Mississippi; frequent.

Herpestis, Gaertn. f.

573. *H. rotundifolia*, Pursh.
Shallow pond near Muscatine.

Gratiola, L. Hedge Hyssop.

574. *C. Virginiana*, L.
Damp places; rather frequent.

Ilysanthes, Raf.

575. *I. riparia*, Raf. False Pimpernel.
Wet places; common.

Synthyris, Benth.

576. *S. Houghtoniana*, Benth.
Sandy soil in open woods, Cedar River region; not rare.

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Veronica, L. Speedwell.

577. *V. Virginica*, L. Culver's-root.
Prairies and woods; common.

578. *V. scutellata*, L. Marsh Speedwell.
Low wet ground at Noels, Scott county.

579. *V. peregrina*, L. Neckweed. Purslane Speedwell.
Damp ground; common.

580. **V. arvensis**, L. Corn Speedwell.
Dry soil, open woods; infrequent.

Seymeria, Pursh.

581. *S. macrophylla*, Nutt. Mullein Foxglove.
Moist place near West Davenport; Cedar River region.

Gerardia, L.

582. *G. grandiflora*, Benth.
Open woods; infrequent.

583. *G. auriculata*, Michx.
Low grounds and prairies; infrequent.

584. *G. aspera*, Dougl.
Cedar River region; infrequent.

585. *G. purpurea*, L. Purple Gerardia.
Low grounds; infrequent.

586. *G. tenuifolia*, Vahl. Slender Gerardia.
Low or dry ground; frequent.

587. *G. tenuifolia*, var. *asperula*, Gray.
Dry hill at Wild Cat Den.

Castilleia, Mutis.

588. *C. coccinea*, Spreng. Scarlet-painted-Cup.
Dry sterile hills and sandy prairies; becoming scarce.

Pedicularis, Tourn. Lousewort.

589. *P. Canadensis*, L. Wood Betony.
Damp hillsides, open woods, etc.; frequent.

590. *P. lanceolata*, Michx.
Wet places, Cedar River region, Allen's Grove, Donahue.

OROBANCHACEÆ.

Aphyllon, Mitchell. Naked Broom-rape.

591. *A. uniflorum*, Gray. One-flowered Cancer-root.
Richman's Woods near Muscatine. One plant, May, 1878.

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LENTIBULARIACEÆ.

Utricularia, L. Bladder-wort.

592. *U. vulgaris*, L.
Ponds and slow-flowing water of Muscatine county; frequent.

593. *U. biflora*, Lam.
Collected in a pond near Cedar River, October, 1878.

BIGNONIACEÆ.

Tecoma, Juss.

594. *T. radicans*, Juss. Trumpet Creeper.
Near old dwellings, ; Fairport, Wyoming Hill.

Catalpa, Scop., Walt.

595. *C. bignonioides*, Walt.
Sparingly escaped; Blue Grass.

PEDALIACEÆ.

Martynia, L.

596. *M. proboscidea*, Glox. Unicorn Plant.
Several plants were found growing in the bed of a creek south of Pleasant Prairie, in 1894. Muscatine, 1878.

ACANTHACEÆ.

Ruellia, Plumier.

597. *R. ciliosa*, Pursh.
Dry grounds; frequent.

VERBENACEÆ.

Verbena, Tourn.

598. *V. urticæfolia*, L. White V.
Waste grounds; common.

599. *V. angustifolia*, Michx.
Sandy river banks; common.

600. *V. hastata*, L. Blue V.
Waste places; common.

601. *V. stricta*, Vent. Hoary V.
Prairies and waste places; common.

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602. *V. bracteosa*, Michx.
Waste places; common.
V. hastata x urticæfolia.
Frequent.

603. *V. hastata x bracteosa.*
Along Pine Creek, near Wild Cat Den. 1894.

604. *V. hastata x stricta.*
Common with the parent species.

605. *V. stricta x angustifolia.*
This hybrid is frequent wherever the parent species are contiguous, as on prairies bordering river banks.

606. *V. stricta x bracteosa.*
Frequent in the vicinity of Moscow.

Lippia, Houst.

607. *L. lanceolata*, Michx. Fog-fruit.
River banks; common.

Phryma, L.

608. *P. Leptostachya*, L. Lopseed.
Open woods; common.

LABIATÆ.

Isanthus, Michx.

609. *I. cæruleus*, Michx. False Pennyroyal.
Dry sandy soil; frequent.

Teucrium, Tourn.

610. *T. Canadense*, L. Wood Sage.
Low grounds; common.

Perilla, L.

611. **P. ocymoides**, L.
Has escaped from cultivation near Blue Grass and persisted for ten years.

Mentha, Tourn. Mint.

612. **M. viridis**, L. Spearmint.
Low grounds; not frequent.

613. *M. Canadensis*, L. Wild Mint.
Low grounds; common.

Lycopus, Tourn. Water Hoarhound.

614. *L. Virginicus*, L. Bugle-weed.
Low places; common.

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615. *L. rubellus*, Moench.
River banks; frequent.

616. *L. sinuatus*, Ell.
Wet grounds; common.

Pycnanthemum, Michx. Mountain Mint.

617. *P. lanceolatum*, Pursh.
Prairies and dry woods; common.

618. *P. linifolium*, Pursh.
Dry prairies; common.

619. *P. muticum*, Pers., var. *pilosum*, Gray.
Hillsides and dry grounds; frequent.

Hedeoma, Pers.

620. *H. pulegioides*, Pers. American Pennyroyal.
Dry soils; frequent.

621. *H. hispida*, Pursh.
Dry prairies and barrens, common.

Salvia, L. Sage.

622. *S. azurea*, Lam., var. *grandiflora*, Benth.
C. R. I. & P. railroad track, Muscatine.

623. *S. lanceolata*, Willd.
Sandy soil; Muscatine Island, streets of Davenport and Muscatine. Infrequent.

Monarda, L. Horse Mint.

624. *M. fistulosa*, L. Wild Bergamot.
Borders of woods, fencerows, and roadsides; common. Albinos are occasionally found.

625. *M. punctata*, L. Horse Mint.
Sandy soil along rivers; common.

Blephilia, Raf.

626. *B. hirsuta*, Benth.
Damp woods; frequent.

Lophanthus, Benth. Giant Hyssop.

627. *L. nepetoides*, Benth.
Thickets and borders of woods; frequent.

638. *L scrophulariæfolius*, Benth.
With the last; infrequent.

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Nepeta, L.

629. **N. Cataria**, L. Catnip.
Near dwellings and in open woods; common.

630. **N. Glechoma**, Benth. Ground Ivy.
Shady places near dwellings; frequent.

Scutellaria, L. Skullcap.

631. *S. lateriflora*, L.
Wet places; common.

632. *S. versicolor*, Nutt.
Woods; infrequent.

633. *S. canescens*, Nutt.
Banks of streams; frequent.

634. *S. parvula*, Michx.
Gravelly hillsides; rather common.

635. *S. parvula*, Michx., var. *mollis*, Gray.
River banks, Buffalo, Devil's Glen.

636. *S. galericulata*, L.
Wet shady places along rivers; frequent.

637. *S. nervosa*, Pursh.
Shady woods along Wapsipinicon; infrequent.

Brunella, Tourn.

638. *B. vulgaris*, L. Heal-all.
Moist woods; common.

Physostegia, Benth.

639. *P. Virginiana*, Benth. False Dragon-head.
Low wet grounds; infrequent.

Marrubium, Tourn.

640. **M. vulgare**, L. Common Hoarhound.
Waste places near dwellings; infrequent.

Leonurus, L.

641. **L. Cardiaca**, L. Motherwort.
Waste places near dwellings; frequent.

Lamium, L. Dead-Nettle.

642. **L. amplexicaule**, L.
Cultivated grounds near East Davenport.

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Stachys, Tourn. Hedge Nettle.

643. *S. palustris*, L.
Moist grounds; common.

644. *S. aspera*, Michx.
Moist grounds; frequent.

PLANTAGINACEÆ.

Plantago, Tourn. Plantain. Ribwort.

645. *P. major*, L.
Railroad tracks and streets; frequent.

646. *P. Rugelii*, Decaisne.
Waste grounds, yards, etc.; very common.

647. **P. lanceolata**, L. Ribgrass. English P.
Introduced with clover and grass seed; infrequent.

648. *P. Patagonica*, Jacq., var. *aristata*, Gray.
Dry prairies; infrequent.

649. *P. Virginica*, L.
Sandy soil; Noels, Muscatine.

NYCTAGINACEÆ.

Oxybaphus, Vahl.

650. *O. nyctagineus*, Sweet.
Dry soil; frequent on railroad tracks.

ILLECEBRACEÆ.

Anychia, Michx. Forked Chickweed.

651. *A. dichotoma*, Michx.
Dry wooded hillsides; common.

652. *A. capillacea*, DC.
Sandy woods, Cedar River region.

AMARANTACEÆ.

Amarantus, Tourn.

653. **A. hypochondriacus**, L.
Railroad tracks in Davenport and Muscatine; also an escape near gardens.

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654. **A. paniculatus**, L.
Waste places; frequent.

655. **A. retroflexus**, L. Pigweed.
Cultivated and waste grounds; very common.

656. **A. chlorostachys**, Will.
Frequent.

657. *A. albus*, L. Tumble Weed.
Waste and cultivated grounds; common.

658. *A. blitoides*, Watson.
Waste places; common.

659. *A. Torreyi*, Benth.
Railroad track from Fruitland to Fairport; frequent. Introduced from the Southwest.

Acnida, Mitch. Water Hemp.

660. *A. tuberculata*, Moq.
River banks; frequent.

Froelichia, Moench.

661. *F. Floridana*, Moquin.
Dry sandy places; abundant locally.

CHENOPODIACEÆ.

Cycloloma, Moquin. Winged Pigweed.

662. *C. platyphyllum*, Moquin.
Usually found with *Froelichia*.

Chenopodium, Tourn.

663. *C. Boscianum*, Moquin.
Open woods; frequent.

664. **C. album**, L. Lamb's Quarters. Pigweed.
Fields and waste places; very common.

665. **C. urbicum**, L.
Streets of Davenport and Muscatine.

666. **C. murale**, L.
Streets of Muscatine.

667. *C. hybridum*, L. Maple-leaved Goosefoot.
Moist rich soil; frequent.

668. *C. glaucum*, L.
Waste grounds of Davenport and Muscatine

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669. **C. Botrys**, L. Jerusalem Oak. Feather Geranium.
Banks of Cedar River; waste places in Davenport and Muscatine.

670. **C. ambrosioides**, L. Mexican Tea.
Waste places near habitations in Davenport and Muscatine.

Atriplex, Tourn.

671. *A. patulum*, L., var. *hastatum*, Gray.
Streets of Davenport and Eldridge.

Salsola, L.

672. **S. Kali**, L., var. **tragus**, DC. Russian Thistle.
Railroad tracks, Davenport and Muscatine; becoming abundant at the latter place.

PHYTOLACCACEÆ.

Phytolacca, Tourn.

673. *P. decandra*, L. Pokeweed.
Near dwellings; infrequent.

POLYGONACEÆ.

Rumex, L.

674. *R. Britannica*, L. Great Water Dock.
Wet places; frequent.

675. *R. altissimus*, Wood. Pale Dock.
Moist soil; not uncommon.

676. *R. verticillatus*, L. Swamp Dock.
Margins of ponds along rivers; infrequent.

677. **R. crispus**, L. Curled Dock.
Waste places; common.

678. **R. obtusifolius**, L. Bitter Dock.
Muscatine, Buffalo, Davenport.

679. **R. acetosella**, L.
Dry fields; common. Becoming a pest in meadows and pastures.

Polygonum, Tourn. Knotweed.

680. *P. aviculare*, L.
Yards and waste places; common.

681. *P. erectum*, L.
With the last; common.

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682. *P. ramosissimum*, Michx.
Sandy soil; rather common.

683. *P. tenue*, Mickx.
Sandy soil, Cedar River, Muscatine Island.

684. *P. lapathifolium*, L., var. *incarnatum*, Watson.
Wet grounds; common.

685. *P. Pennsylvanicum*, L.
Moist waste grounds; common.

686. *P. amphibium*, L.
In water and mud, ponds along the Mississippi, Cedar, and Wapsie; infrequent.

687. *P. Muhlenbergii*, Watson.
Low grounds; common. A troublesome weed.

688. *P. Hartwrightii*, Gray.
Margins of ponds; Eldridge, Noels, and islands of Mississippi River.

689. **P. orientale**, L. Prince's Feather.
Escaped from Gardens; frequent along river bank in Muscatine and Davenport.

690. **P. Persicaria**, L.
Waste places; common.

691. *P. Hydropiper*, L.
Wet grounds; common.

692. *P. acre*, HBK.
Wet grounds; common.

693. *P. Virginianum*, L.
Moist rich woodlands; infrequent.

694. *P. sagittatum*, L. Arrow-leaved Tear-thumb.
Low grounds; rather frequent.

695. **P. Convolvulus**, L. Black Bindweed.
Waste places; frequent.

696. *P. dumetorum*, L., var. *scandens*, Gray.
Thickets; frequent.

697. P. **cuspidatum**, Sieb. & Zucc.
Escaped from gardens at Wilton.

Fagopyrum, Tourn.

698. F. **esculentum**, Moench. Buckwheat.
Spontaneous in fields and roadsides.

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ARISTOLOCHIACEÆ.

Asarum, Tourn.

699. *A. Canadense,* L. Wild Ginger.
Rich woods; not rare.

Aristolochia, Tourn.

700. *A. Serpentaria,* L. Virginia Snakeroot.
Woodlands, Wyoming Hill, T'w'p. Seventy-six; rare.

SANTALACEÆ.

Comandra, Nutt.

701. *C. umbellata,* Nutt. Bastard Toad-flax.
Dry grounds; frequent.

EUPHORBIACEÆ.

Euphorbia, L. Spurge.

702. *E. Geyeri,* Engelm.
Common in sandy soil near Cedar River.

703. *E. glyptosperma,* Engelm.
Sandy soil; frequent near Cedar River.

704. *E. maculata,* L.
Waste places; common.

705. *E. Preslii,* Guss.
Waste places; common.

706. *E. hexagona,* Nutt.
Sandy soil, Cedar River region.

707. *E. marginata,* Pursh.
Escaped; streets of Davenport and Muscatine.

708. *E. corollata,* L.
Fields and waste places; common.

709. *E. dentata,* Michx.
Sandy soil, Fruitland.

710. *E. heterophylla,* L.
Sandy soil along rivers; frequent.

711. *E. dictyosperma,* Fischer & Meyer.
Sandy soil along rivers; infrequent.

712. **E. Cyparissias,** L.
Escaped from gardens; frequent.

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713. **E. Peplus**, L.
Muscatine; infrequent. Probably of recent introduction.

Croton, L.

714. *C. glandulosus*, L.
Sandy soil; common.

715. *C. capitatus*, Michx.
Dry sandy soil; abundant locally; West Davenport, islands of the Mississippi, Camp McClellan.

716. *C. Texensis*, Muell.
Front street, Muscatine; infrequent.

Acalypha, L.

717. *A. Virginica*, L. Three-seeded Mercury.
Fields, woods and waste places; common.

718. *A. Virginica*, var. *gracilens*, Muell.
Dry sandy soil; frequent and abundant locally.

URTICACEÆ.

Ulmus, L. Elm.

719. *U. fulva*, Michx. Slippery or Red Elm.
Woods; rather uncommon.

720. *U. Americana*, L. River or White Elm
Along streams; common.

Celtis, Tourn.

721. *C. occidentalis*, L. Hackberry.
Woods and river banks; frequent.

Cannabis, Tourn.

722. **C. sativa**, L. Hemp.
Waste places; common.

Humulus, L.

723. *H. Lupulus*, L. Hop.
Woods, roadsides, and near dwellings; infrequent.

Maclura, Nutt.

724. *M. aurantiaca*, Nutt. Osage Orange.
Planted as hedge and very sparingly escaped.

Morus, Tourn.

725. *M. rubra*, L. Red Mulberry.
Rich woods; infrequent.

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Urtica, Tourn.

726. *U. gracilis,* Ait. Nettle.
Moist waste places; infrequent.

Laportea, Gaudichaud.

727. *L. Canadensis,* Gaudichaud. Wood Nettle.
Rich woods; infrequent.

Pilea, Lindl.

728. *P. pumila,* Gray. Richweed. Clearweed.
Moist shady woods; frequent.

Boehmeria, Jacq.

729. *B. cylindrica,* Willd. False Nettle.
Moist rich soil; rare. Wild Cat Den; Noels.

Parietaria, Tourn.

730. *P. Pennsylvanica,* Muhl.
Moist shady places; common.

PLATANACEÆ.

Platanus, L.

731. *P. occidentalis,* L. Sycamore. Buttonwood.
River banks; common.

JUGLANDACEÆ.

Juglans, L

732. *J. cinerea,* L. Butternut. White Walnut.
Wcods; frequent.

733. *J. nigra,* L. Black Walnut.
Woods; rather common.

Carya, Nutt. Hickory.

734. *C. olivæformis,* Nutt. Pecan.
Along rivers; rare within our limits. Islands of the Mississippi River.

735. *C. alba,* Nutt. Shell-bark or Shag-bark H.
Common.

736. *C. sulcata,* Nutt. Big Shell-bark. King Nut.
Infrequent in our limits. Along Wapsipinicon River, on islands of Mississippi, along Cedar River.

737. *C. tomentosa,* Nutt. Mocker Nut. White-heart H.
The most common hickory.

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738. *C. amara*, Nutt. Bitter Nut or Swamp H.
Frequent in low grounds and not rare in hilly woodlands.

739. *C. olivæformis x tomentosa.*
Big timber near Muscatine.

740. *C. olivæformis x amara.*
Big timber near Muscatine.

CUPULIFERÆ.

Betula, Tourn.

741. *B. lutea*, Michx. f. Yellow or Gray Birch.
Along rivers; common.

Corylus, Tourn.

742. *C. Americana*, Walt. Wild Hazelnut.
Thickets and open woods; common.

Ostrya, Micheli.

743. *O. Virginica*, Willd. American Hop-Hornbeam.
Woods; frequent.

Carpinus, L. Hornbeam. Ironwood.

744. *C. Caroliniana*, Walter. Blue or Water Beech.
Along creeks; infrequent.

Quercus, L. Oak.

745. *Q. alba*, L. White Oak.
Common.

746. *Q. macrocarpa*, Michx. Burr Oak.
Common.

747. *Q. bicolor*, Willd. Swamp White Oak.
Along rivers; frequent.

748. *Q. Muhlenbergii*, Engelm. Chestnut Oak.
Bluff woodlands below Muscatine. Several trees on hillside by railroad cut near N. W. Davenport (Radenhausen).

749. *Q. rubra*, L. Red Oak.
Common.

750. *Q. coccinea*, Wang., var. *tinctoria*, Gray. Yellow-barked Oak.
Frequent.

751. *Q. ellipsoidalis*, E. J. Hill.
One tree near Big Rock. See description at end of list.

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752. *Q. palustris*, Du Roi. Pin Oak.
Along rivers; frequent.

753. *Q. imbricaria*, Michx. Shingle Oak.
Cedar T'w'p. and Offerman's Island. Several trees at each place.

SALICACEÆ.

Salix, Tourn. Willow.

754. *S. nigra*, Marsh. Black Willow.
Along streams; common.

755. *S. amygdaloides*, Anders.
Along streams; rather common. One tree having hermaphrodite flowers grows near Blue Grass.

756. **S. Fragilis**, L. Crack Willow.
Several trees along stream near Blue Grass.

757. **S. alba**, L., var. **vitellina**, Kock.
Frequent.

758. **S. Babylonica**, Tourn. Weeping Willow.
Two trees near Muscatine and one northeast of Eldridge, apparently spontaneous.

759. *S. longifolia*, Muhl.
Low wet grounds; common.

760. *S. rostrata*, Richardson.
A single shrub in low ground at Eldridge.

761. *S. discolor*, Muhl. Glaucous Willow.
Banks of creeks; rather common.

762. *S. humilis*, Marsh. Prairie Willow.
Dry prairies; frequent.

763. *S. petiolaris*, Smith.
Low wet grounds; frequent.

764. **S. purpurea**, L.
Along Mud Creek, Muscatine.

765. *S. cordata*, Muhl. Heart-leaved Willow.
Wet places; common.

766. *S. cordata*, var. *angustata*, Anders.
With the type; infrequent.

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Populus, Tourn. Poplar.

767. **P. alba**, L. Silver Leaf.
Roadsides; common.

768. *P. tremuloides*, Michx. American Aspen.
Woods; infrequent.

769. *P. grandidentata*, Michx. Large-toothed Aspen.
Open woods; frequent.

770. *P. monilifera*, Ait. Cottonwood.
Planted extensively.

CERATOPHYLLACEÆ.

Ceratophyllum, L.

771. *C. demersum*, L. Hornwort.
Ponds and slow-flowing water; frequent.

CONIFERÆ.

Pinus, Tourn.

772. *P. Strobus*, L. White Pine.
A few large trees grow on cliffs at Wild Cat Den.

Juniperus, L.

773. *J. Virginiana*, L. Red Cedar.
Rocky hillsides; infrequent.

HYDROCHARIDACEÆ.

Elodea, Michx.

774. *E. Canadensis*, Michx. Water Weed.
Ponds and slow streams; frequent.

Vallisneria, L.

775. *V. spiralis*, L. Tape Grass. Eel Grass.
Ponds of Mississippi River islands.

ORCHIDACEÆ.

Microstylis, Nutt.

776. *M. ophioglossoides*, Nutt. Adder's Mouth.
Woods along Millar's Creek in Bloomington Township. Collected once, 1892. (Mackenzie.)

Liparis, Richard. Twayblade.

777. *L. liliifolia*, Richard.
Moist woods; Allen's Grove, Wild Cat Den., etc.; infrequent.

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778. *L. Loeselii*, Richard.
Boggy places, Cedar River region; rare.

Corallorhiza, Haller.

779. *C. odontorhiza*, Nutt. Coral-root.
Three plants in rich woods at Allen's Grove, Sept. 17, 1892.

Spiranthes, Richard. Ladies' Tresses.

780. *S. cernua*, Richard.
Wet meadows and boggy places; infrequent.

781. *S. gracilis*, Bigelow.
Dry soil; Wild Cat Den, Cedar River region, Muscatine; rare.

Goodyera, R. Br.

782. *G. pubescens*, R. Br. Rattlesnake Plantain.
Wooded ravine at Wild Cat Den; also found sparingly in the Cedar River region.

Calopogon, R. Br.

783. *C. pulchellus*, R. Br.
Boggy places in Cedar River region. With *Lechea tenuifolia*, *Helianthemum Canadense*, *Coreopsis palmata*, and *Viola pedata* on a dry gravelly hillside at Wild Cat Den! Infrequent.

Orchis, L.

784. *O. spectabilis*, L. Showy Orchis.
Rich woods; infrequent. Abundant at Allen's Grove, Scott county.

Habenaria, Willd. Rein Orchis.

785. *H. tridentata*, Hook.
Borders of hilly woods in damp sandy soil along Cedar River; infrequent.

786. *H. virescens*, Spreng.
Meadow in vicinity of Salisbury Bridge, Cedar River region.

787. *H. bracteata*, R. Br.
Moist rich woodlands; infrequent. In dry soil with *Asclepias quadrifolia* at Wild Cat Den.

788. *H. leucophæa*, Gray.
Moist prairies near Eldridge. First observed after the rainy spring of 1898.

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Cypripedium, L. Lady's Slipper.

789. *C. candidum*, Muhl. Small White Lady's Slipper.
Abundant in a swale near Eldridge, blooming in very wet years only. Muscatine; rare.

790. *C. parviflorum*, Salisb. Smaller Yellow L.
Rich woods; infrequent.

791. *C. pubescens*, Willk. Larger Yellow L.
Rich woods; more frequent than the preceding species.

792. *C. spectabile*, Swartz. Showy L.
Boggy places and wet hillsides in various localities in Muscatine county; now quite scarce.

IRIDACEÆ.

Iris, Tourn. Flower-de-Luce.

793. *I. versicolor*, L. Larger Blue Flag.
Wet places; common.

Sisyrinchium, L.

794. *S. angustifolium*, Mill.
Meadows; common.

AMARYLLIDACEÆ.

Hypoxis, L.

795. *H. erecta*, L. Star Grass.
Grassy places; common.

DIOSCOREACEÆ.

Dioscorea, Plumier.

796. *D. villosa*, L. Wild Yam-root.
Woods; rather common.

LILIACEÆ.

Smilax, Tourn. Green Brier. Cat Brier.

797. *S. herbacea*, L. Carrion Flower.
Moist woods and river banks; infrequent.

798. *S. ecirrhata*, Watson.
Woods; frequent. In the low forms there are no tendrils, in taller plants the upper leaves are tendril-bearing.

799. *S. hispida*, Muhl.
Thickets and moist woods; frequent.

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Allium, L.

800. *A. tricoccum*, Ait. Wild Leek.
Rich woods; frequent.

801. *A. Canadense*, Kalm. Wild Garlic.
Prairies and open woods; common.

Camassia, Lindl.

802. *C. Fraseri*, Torr. Wild Hyacinth.
Rich open woods and prairies; infrequent.

Polygonatum, Tourn.

803. *P. giganteum*, Dietrich. Great Solomon's Seal.
Moist woods; frequent.

Asparagus, Tourn.

804. **A. officinalis**, L.
Escaped from cultivation.

Smilacina, Desf. False Solomon's Seal.

805. *S. racemosa*, Desf. False Spikenard.
Moist woods; common.

806. *S. stellata*, Desf.
With the last; common.

Maianthemum, Wigg.

807. *M. Canadense*, Desf.
Steep rocky hillside at Wild Cat Den; confined to small area.

Uvularia, L

808. *U. grandiflora*, Smith. Bellwort.
Moist rich woods; infrequent.

Oakesia, Watson.

809. *O. sessilifolia*, Watson.
Cedar River region, in woods; infrequent.

Erythronium, L.

810. *E. albidum*, Nutt. White Dog's-tooth Violet.
Rich woods; frequent.

Lilium, L. Lily.

811. *L. Philadelphicum*, L. Wild Orange-red Lily.
Dry prairies; infrequent.

812. *L. Canadense*, L. Wild Yellow Lily.
Prairies, meadows, and borders of woods; not infrequent.

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Trillium, L. Wake Robin. Birthroot.

813. *T. recurvatum*, Beck.
Rich woods; infrequent.

814. *T. erectum*, L.
Rich woods; scarce. Flowers white, rather small.

PONTEDERIACEÆ.

Pontederia, L.

815. *P. cordata*, L. Pickerel-weed.
Ponds and slowly-flowing waters; frequent in Muscatine Co.

Heteranthera, Ruiz. & Pav.

816. *H. graminea*, Vahl. Mud Plantain.
Mud and shallow water; infrequent.

XYRIDACEÆ.

Xyris, Gronov.

817. *X. flexuosa*, Muhl. Yellow-eyed Grass.
Boggy places near Cedar River; rare.

COMMELINACEÆ.

Commelina, Dill.

818. *C. Virginica*, L.
Dry sandy soil along railroad tracks near Fruitland.

Tradescantia, L. Spiderwort.

819. *T. Virginica*, L.
Railroad tracks; common.

820. *T. Virginica*, var. *villossa*, Watson.
Sandy soil, Cedar River region. Flowers are often light rose-color.

JUNCACEÆ.

Juncus, Tourn. Rush.

821. *J. marginatus*, Rostk.
Muscatine county; infrequent.

822. *J. tenuis*, Willd.
Fields, roadsides, etc.; common.

823. *J. acuminatus*, Michx.
Muscatine county; infrequent.

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824. *J. nodosus*, L., var. *megacephalus*, Torr.
Wet grounds; common.

825. *J. Canadensis*, J. Gay.
Muscatine county; infrequent.

Luzula, DC. Wood Rush.

826. *L. vernalis*, DC.
Moist sandy soil at Wild Cat Den.

827. *L. campestris*, DC.
Woodlands; infrequent.

TYPHACEÆ.

Typha, Tourn.

828. *T. latifolia*, L. Cat-tail.
Sloughs; common.

Sparganium, Tourn. Burr-reed.

829. *S. eurycarpum*, Engelm.
Marshy places; rather frequent.

830. *S. simplex*, Huds., var. *androcladum*, Engelm.
Marshy places. Along Cedar River in Lake T'w'p., Muscatine county, June, 1894. Atalissa, September, 1896. Infrequent in Scott county.

ARACEÆ.

Arisæma, Martins.

831. *A. tryphyllum*, Torr.
Moist rich woods; frequent.

832. *A. Dracontium*, Schott. Dragon-root.
Low grounds along rivers; frequent.

Symplocarpus, Salisb.

833. *S. foetidus*, Salisb. Skunk Cabbage.
Swampy grounds; infrequent.

Acorus, L.

834. *A. Calamus*, L.
Swampy grounds; infrequent.

LEMNACEÆ.

Spirodela, Schleiden.

835. *S. polyrrhiza*, Schleiden.
Ponds; common.

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Lemna, L. Duckweed.

836. *L. trisulca*, L.
Ponds near Cedar River; abundant locally.

837. *L. minor*, L.
Ponds; frequent. Found in bloom along Cedar River near the B. C. R. & N. Railroad bridge, September 24, 1894.

Wolffia, Horkel.

838. *W. Columbiana*, Karsten.
Growing with *L. trisulca*, *L. minor*, *and Spirodela* in Oepping's Pond, near Moscow.

839. *W. Brasiliensis*, Weddell.
Ponds; common.

ALISMACEÆ.

Alisma, L.

840. *A. Plantago*, L. Water Plantain.
Shallow water and margins of ponds; common.

Sagittaria, L. Arrow-head.

841. *S. variabilis*, Engelm.
Wet places; common. The varieties, *obtusa*, *latifolia*, and *angustifolia* are also found.

842. *S. heterophylla*, Pursh.
Sloughs and swampy places on Muscatine Island; not rare.

843. *S. graminea*, Michx.
Wet places; frequent.

844. *S. calycina*, Engelm.
In mud and shallow water along the Mississippi River. Muscatine Island.

Echinodorus, Richard.

845. *E. rostratus*, Engelm.
Margins of ponds, etc. Muscatine Island; infrequent.

NAIADACEÆ.

Potamogeton, Tourn. Pondweed.

846. *P. natans*, L.
Ponds along Cedar River; infrequent.

847. *P. Pennsylvanicus*, Cham.
Ponds along Cedar River, June, 1894. Infrequent.

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848. *P. Spirillus*, Tuckerm.
Shallow pond on Muscatine Island, July, 1894. (Mackenzie.) 1896.

849. *P. fluitans*, Roth.
Rivers, sloughs and ponds. Plants in the Mississippi River have the submersed leaves over a foot long.

850. *P. amplifolius*, Tuckerm.
Ponds and sloughs along Cedar River; infrequent. July, 1894.

851. *P. Illinoensis*, Morong.
Muscatine Slough and ponds on Muscatine Island; rather frequent.

852. *P. zosteræfolius*, Schum.
Ponds along Cedar River; infrequent.

853. *P. pauciflorus*, Pursh.
Ponds and sloughs; rather frequent.

854. *P. pusillus*, L.
Ponds and sloughs along Cedar River; not frequent.

855. *P. mucronatus*, Schrad.
Muscatine Slough and sloughs along Cedar River.

856. *P. pectinatus*, L.
Ponds and sloughs; not infrequent.

Zannichellia, Micheli.

857. *Z. palustris*, L.
Ponds and sloughs of Muscatine county; frequent.

Naias, L.

858. *N. flexilis*, Rostk. & Schmidt.
Habitat and range of the preceding but less frequent.

CYPERACEÆ.

Cyperus, Tourn.

859. *C. diandrus*, Torr.
Low grounds along Cedar River; infrequent.

860. *C. diandrus*, Torr., var. *castaneus*, Torr.
Low grounds; common.

861. *C. aristatus*, Rottb.
Sandy soil along rivers; frequent.

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862. *C. acuminatus*, Torr.
Low sandy soil; Noels; near Follets.

863. *C. Schweinitzii*, Torr.
Dry sandy soil along Cedar and Wapsipinicon Rivers.

864. *C. filiculmis*, Vahl.
With the last; also on dry hillside at Wild Cat Den.

865. *C. erythrorhizos*, Muhl.
River shores; frequent.

866. *C. esculentus*, L.
Cultivated grounds; rather frequent.

867. *C. strigosus*, L.
Common in moist soil.

868. *C. strigosus*, *L.*, var. *compositus*, Britton.
Wet grounds; infrequent.

869. *C. speciosus*, Vahl.
Usually found with *C. erythrorhizos*, Muhl.

Dulichium, Pers.

870. *D. spathaceum*, Pers.
Margins of ponds; Moscow; Noels.

Eleocharis, R. Br. Spike Rush.

871. *E. atropurpurea*, Kunth.
Growing with *Fimbristylis capillaris*, Gray, in wet sand near Fruitland. Determined by Britton.

872. *E. ovata*, R. Br.
In mud and wet sand; rather frequent.

873. *E. palustris*, R. Br.
Common in low ground.

874. *E. palustris*, R. Br., var. *glaucescens*, (Willd.) Gray.
Low wet ground; Davenport, Noels.

875. *E. tenuis*, Schultes.
Frequent.

876. *E. compressa*, Sullivant.
Frequent in low grounds.

877. *E. acicularis*, R. Br.
Common in wet grounds.

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Fimbristylis, Vahl.

878. *F. autumnalis*, Roem. &. Schult.
Wet sandy soil; infrequent. Two forms have been observed; the form found near the Wapsipinicon and Cedar Rivers has low, tufted culms, papillose hairy leaves, compound umbel, and smooth achene; the form found near Fruitland is erect, not tufted, with simple umbels, and sculptured achene smaller and more obovate.

878. *F. capillaris*, Gray.
Sandy soil; Fruitland, Noels.

Scirpus, Tourn. Bulrush. Club Rush.

879. *S. pungens*, Vahl.
Shores of Mississippi River; frequent.

880. *S. lacustris*, L.
Sloughs and river shores; common.

881. *S. supinus*, L., var. *Hallii*, Gray.
Fruitland; rare.

882. *S. atrovirens*, Muhl.
Common in wet places.

Eriophorum, L. Cotton Grass.

883. *E. lineatum*, Benth. & Hook.
Wet places; frequent.

884. *E. cyperinum*, L.
With the last but less frequent.

885. *E. polystachon*, L.
Swale near Eldridge (two plants); infrequent in boggy soil along Cedar River.

Hemicarpha, Nees.

886. *H. subsquarrosa*, Nees.
In sand along rivers; frequent.

Scleria, Berg. Nut Rush.

887. *S. triglomerata*, Michx.
Dry sterile hillside, Wild Cat Den.

Carex, Ruppius. Sedge.

888. *C. Grayii*, Carey.
River banks; frequent.

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889. *C. lupulina.*
Borders of ponds and along rivers; frequent.

890. *C. monile*, Tuckerm.
Swales. Moscow, Noels.

891. *C. hystricina*, Muhl.
Sloughs and creeks; common.

892. *C. Pseudo-Cyperus*, L., var. *Americana*, Hochst.
Borders of ponds in the Cedar River region; infrequent.

893. *C. squarrosa*, L.
With *C. Grayii*, Carey, but less frequent. Our plant is *C. typhinoides*, Schwein.

894. *C. Shortiana*, Dewey.
Marshy soil in a ravine at Wild Cat Den.

895. *C. filiformis*, L., var. *latifolia*, Boeckl.
Common. A form with narrow leaves is frequent.

896. *C. trichocarpa*, Muhl.
Margin of a pond, Little's Grove, Scott county.

897. *C. trichocarpa*, Muhl., var. *Deweyii*, Bailey.
Common on banks of Mississippi River. Noels.

898. *C. fusca*, All.
Swales near Noels and Eldridge.

899. *C. stricta*, Lam., var. *angustata*, Bailey.
Swales; frequent.

900. *C. stricta*, Lam., var. *decora*, Bailey.
Swales; frequent.

901. *C. longirostris*, Torr.
Cliff near Big Rock, with *Stipa spartea*, Trin. Abundant on Government Island.

902. *C. Davisii*, Schwein. & Torr.
Low grounds; Noels, Moscow, West Liberty.

903. *C. grisea*, Wahl.
Banks of Wapsipinicon; infrequent.

904. *C. grisea*, Wahl., var. *angustifolia*, Boot.
(*C. amphibola*, Stend.)
Moist soil, especially rich woodlands along rivers; frequent.

905. *C. conoidea*, Schkuhr.
Low unbroken prairie near Noels; rare.

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906. *C. oligocarpa*, Schkuhr.
Rich woods; frequent.

907. *C. laxiflora*, Lam.
Rich woods; common.

908. *C. laxiflora*, Lam., var. *striatula*, Carey.
(*C. laxiflora blanda*, (Dew.) Boott.)
With the last; common.

909. *C. laxiflora*, Lam., var. *latifolia*, Boott.
(*C. albursina*, Sheldon.)
Moist rich woods; Wild Cat Den, Allen's Grove.

910. *C. digitalis*, Willd., var. *copulata*, Bailey.
Growing with the last in ravines at Wild Cat Den; rare.

911. *C. tetanica*, Schkuhr., var. *Meadii*, Bailey.
Grass lands; frequent.

912. *C. Pennsylvanica*, Lam.
Dry woodlands; common.

913. *C. communis*, Bailey.
Large tufts of this species grow upon sides of cliffs at Wild Cat Den; rare.

914. *C. pubescens*, Muhl.
Rich woods; infrequent.

915. *C. Jamesii*, Schwein.
Moist rich woods; Wilton, Wild Cat Den; rare.

916. *C. stipata*, Muhl.
Low wet ground; not common.

917. *C. crus-corvi*, Shuttlew.
Borders of Muscatine Slough; rare.

918. *C. gravida*, Bailey.
Dry soil; frequent.

919. *C. gravida*, Bailey, var. *laxifolia*, Bailey.
Dry sandy soil; Buffalo, Noels.

920. *C. vulpinoidea*, Michx.
Common in low ground.

921. *C. xanthocarpa*, Bicknell.
(Bull. Torr. Club, XX, 22 (1896).)
Dry meadows; Buffalo, Blue Grass.

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922. *C. Sartwellii*, Dewey.
Low places; infrequent.

923. *C. rosea*, Schkuhr.
Rich woods; frequent.

924. *C. sparganioides*, Muhl.
Rich woods; infrequent.

925. *C. cephaloidea*, Dewey.
Low ground near Valley City, Scott county; rare.

926. *C. cepalophora*, Muhl.
Dry sterile soil; frequent.

927. *C. sterilis*, Willd., var. *excelsior*, Bailey.
(Bull. Torr. Club, XX, 425, (1893). "Very like *C. Atlantica*."—*Prof. Bailey.*)
Low grass land; Buffalo, Scott county. Abundant locally.

928. *C. interior*, Bailey.
(Bull. Torr. Club, XX, 426, (1893).)
Swale near Eldridge, Scott county. Abundant locally.

929. *C. Muskingumensis*, Schwein.
In woods along Mississippi and Wapsipinicon Rivers; infrequent.

930. *C. tribuloides*, Wahl.
Low ground; frequent.

931. *C. tribuloides*, Wahl., var. *cristata*, Bailey.
Moist ground; rather common

932. *C. scoparia*, Schkuhr.
Low ground; frequent.

933. *C. foenea*, Willd.
Dry grass land near Eldridge. "Very like *C. silicea*."—*Prof. Bailey.*

934. *C. foenea*, Willd., var. *perplexa*, Bailey.
Swales near Noels and Buffalo; on a dry wooded hillside near Big Rock. Rare.

935. *C. straminea*, Willd.
Open woods along Wapsipinicon River and at Blue Grass.

936. *C. straminea*, Willd., var. ?.
Dry woods and prairies; rather frequent.

937. *C. straminea*, Willd., var. *ferruginea*, Bailey.
In a swale near Walcott, Scott county; rare.

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GRAMINEÆ.

Spartina, Schreber.

938. *S. cynosuroides*, Willd. Fresh-water Cord-grass.
Banks of rivers and creeks; common.

Paspalum, L.

939. *P. setaceum*, Michx.
Our plant is the *P. ciliatifolium* of Michaux. Dry sandy soil; infrequent.

Panicum, L. Panic Grass.

940. *P. filiforme*, L.
Dry sterile hillside, Wild Cat Den.

941. **P. glabrum**, Gaudin.
This and the next species are common in all soils; as observed in our range *P. glabrum* thrives better in poor soil than *P. sanguinale*.

942. **P. sanguinale**, L. Crab or Finger Grass.

943. *P. proliferum*, Lam.
Common. Abundant in rich waste places where the soil has been disturbed, especially roadsides upon which "graders" have been used and railroad tracks "surfaced" with loose earth.

944. *P. capillare*, L. Old-witch Grass.
Common.

945. *P. autumnale*, Bosc.
Abundant over limited area of sand at Fruitland and Noels.

946. *P. virgatum*, L.
River banks and low grounds; common.

947. *P. latifolium*, L.
Rich woods; infrequent.

948. *P. scoparium*, Lam.
Moist grass lands; infrequent.

949. *P. depauperatum*, Muhl.
Dry soil, Wild Cat Den, Noels.

950. *P. dichotomum*, L.
Meadows, prairies and open woods; common.

951. *P. pubescens*, Lam.
Low prairies; frequent.

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952. **P. Crus-galli**, L. Barnyard Grass.
Common in moist waste and cultivated grounds. Especially abundant in 1892. The awnless form (var. *muticum*, Vasey.) is frequent on the banks of the Mississippi River in Davenport and Muscatine.

Setaria, Beauv. Bristly Foxtail Grass.

953. **S. verticillata**, Beauv.
Streets and waste places of Davenport; Muscatine, West Liberty; common.

954. **S. glauca**, Beauv.
Common.

955. **S. viridis**, Beauv.
Common.

956. **S. Italica**, Kunth. "Hungarian."
A frequent escape into waste places.

Cenchrus, L. "Sand Burr." Hedgehog Grass.

957. *C. tribuloides*, L.
Sandy soil; common and abundant.

Leersia, Swartz.

958. *L. Virginica*, Willd. White Grass.
Moist woods; rather infrequent.

959. *L. oryzoides*, Swartz. Rice Cut-Grass.
Marshy places; frequent.

960. *L. lenticularis*, Michx. Catch-fly Grass.
Low grounds along Mississippi River; common.

Zizania, Gronov.

961. *Z. aquatica*, L. Indian Rice. Water Oats.
Shallow ponds of Muscatine Island and the Cedar River region; frequent.

Tripsacum, L. Gama-Grass. Sesame-Grass.

962. *T. dactyloides*, L.
A large clump on railroad near Wyoming Hill, Muscatine county.

Andropogon, Royen. Beard-Grass.

963. *A. furcatus*, Muhl.
Dry prairies; common.

964. *A. scoparius*, Michx.
Dry soil; common.

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965. *A. Hallii*, Hackel.
Well established in several places on C. R. I. & P. Railroad near Fairport.

Chrysopogon, Trin.

966. *C. nutans*, Benth. Indian Grass. Wood Grass.
Dry prairies; common.

Sorghum,

967. *S. Halepense*, L.
Railroad tracks, Wilton, Muscatine, Fairport.

Phalaris, L. Canary Grass.

968. *P. arundinacea*, L. Reed Canary Grass.
Shallow water; Eldridge, Walcott, Cedar River region.

969. *P. arundinacea*, L., var. *picta*, Gray. Ribbon Grass.
Street, Eldridge, Davenport.

Aristida, L. Triple-awned Grass.

970. *A. basiramea*, Engelm.
Dry sandy soil; Muscatine Island, Cedar River region, Noels.

971. *A. gracilis*, Ell.
With the last at Muscatine Island and Noels.

972. *A. oligantha*, Michx.
Becoming frequent in dense patches; Davenport, Buffalo, Blue Grass.

973. *A. tuberculosa*, Nutt.
Sandy soil, Muscatine county; infrequent.

Stipa, L.

974. *S. spartea*, Trin. Porcupine Grass.
Dry prairies; frequent.

Oryzopsis, Michx. Mountain Rice.

975. *O. melanocarpa*, Muhl.
Rocky woods, Wild Cat Den.

Muhlenbergia, Schreber.

976. *M. sobolifera*, Trin.
Rocky woods, Wild Cat Den; rare.

977. *M. glomerata*, Trin.
Low grounds; common.

978. *M. Mexicana*, Trin.
Low grounds; common.

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979. *M. sylvatica*, Torr. & Gray.
Frequent in low or rocky woods.

980. *M. Willdenovii*, Trin.
Dry woods; frequent.

981. *M. diffusa*, Schreber. Drop Seed. Nimble Will.
Dry woods and waste places; common.

Brachyelytrum, Beauv.

982. *B. aristatum*, Beauv.
Rocky woods, Wild Cat Den.

Phleum, L.

983. **P. pratense**, L. Timothy.
Common.

Alopecurus, L. Foxtail.

984. **A. geniculatus**, L.
Low moist places; infrequent.

Sporobolus, R. Br. Drop-seed Grass.

985. *S. asper*, Kunth.
Dry sandy soil; frequent.

986. *S. neglectus*, Nash.
(*S. vaginæflorus*, Vasey.—Manual.)
For nomenclature of this and the next species see Bull. Torr. Club, XXII:464. 1895.
Dry soil; frequent. Very abundant locally.

987. *S. vaginæflorus*, Wood.
(*S. minor*, Vasey.—Manual.)
Dry soil; hardly less frequent than the preceding species.

988. *S. heterolepis*, Gray.
Dry prairies; frequent.

989. *S. cryptandrus*, Gray.
Dry sand; Muscatine Island, banks of Cedar River.

Agrostis, L.

990. **A. alba**, L. Fiorin. White Bent-Grass.
Meadows; infrequent.

991. **A. alba**, L., var. **vulgaris**, Thurb. Red Top.
Meadows; common.

992. *A. perennans*, Tuckerm. Thin-Grass.
Rich woods; infrequent.

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993. *A. scabra*, Willd. Hair Grass.
Dry soil; frequent.

Cinna, L.

994. *C. arundinacea*, L. Wood Reed-Grass.
Moist woods; Allen's Grove, Wild Cat Den.

Calamagrostis, Adans.

995. *C. Canadensis*, Beauv. Blue-Joint Grass.
Wet grounds; rather common.

Avena, Tourn. Oat.

996. **A. fatua**, L.
B. C. R. & N. tracks, Blue Grass.

Danthonia, DC. Wild Oat-Grass.

997. *D. spicata*, Beauv.
Dry rocky soil; Wild Cat Den, Wyoming Hill.

Bouteloua, Lagasca. Muskit-Grass.

998. *B. hirsuta*, Lag.
Sandy soil; Muscatine Island and the Cedar River region; frequent.

999. *B. racemosa*, Lag., var. *aristosa*, Gray.
Sandy soil; frequent.

Eleusine, Gaertn.

1000. **E. Indica**, Gaertn. Dog's-Tail Grass.
Street, Muscatine.

Triodia, R. Br.

1001. *T. cuprea*, Jacq. Tall Red Top.
Dry gravelly soil, Wyoming Hill.

1002. *T. purpurea*, Hack. Sand-Grass.
Dry sand, Muscatine county; frequent.

Phragmites, Trin. Reed.

1003. *P. communis*, Trin.
Borders of ponds; infrequent.

Koeleria, Pers.

1004. *K. cristata*, Pers.
Dry hills and prairies; rather common.

Eatonia, Raf.

1005. *E. obtusata*, Gray.
Dry prairies; not common.

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1006. *E. Pennsylvanica*, Gray.
Moist meadows; common.

Eragrostis, Beauv.

1007. *E. reptans*, Nees.
Moist soil along rivers; frequent.

1008. **E. major**, Host.
Common.

1009. *E. Frankii*, Meyer.
Moist soil; common. With the odor of *E. major*.

1010. *E. Purshii*, Schrader.
Common.

1011. *E. tenuis*, Gray.
Sandy soil; Fruitland.

1012. *E. pectinacea*, Gray.
Common in dry sandy soil along railroads.

Melica, L.

1013. *M. diffusa*, Pursh.
Muscatine county; rare.

Dactylis, L.

1014. **D. glomerata**, L. Orchard Grass.
Streets and waste places; frequent.

Poa, L. Meadow Grass. Spear Grass.

1015. **P. annua**, L. Low Spear Grass.
Sparingly escaped from lawns, Davenport.

1016. **P. compressa**, L. English Blue Grass.
Dry soil; common.

1017. *P. serotina*, Ehrhart. False Red Top.
Wet meadows; infrequent.

1018. *P. pratensis*, L. Bluegrass.
Common everywhere.

1019. *P. debilis*, Torr.
Rocky woods near base of cliff at Wild Cat Den; rare.

Glyceria, R. Br. Manna Grass.

1020. *G. nervata*, Trin. Fowl Meadow Grass.
Moist meadows; common.

1021. *G. fluitans*, R. Br.
Shallow water; infrequent.

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Festuca, L. Fescue Grass.

1022. *F. tenella*, Willd.
Dry sterile soil; common.

1023. *F. ovina*, L.
Escaped into waste places.

1024. *F. nutans*, Willd.
Rocky woods; rather common.

1025. *F. Shortii*, Kunth.
(*F. nutans*, Willd.—Manual.)
Swale near Noels; rare.

1026. **F. elatior**, L., var. **pratensis**, Gray.
Railroad track, Blue Grass; rare.

Bromus, L. Brome Grass.

1027. **B. secalinus**, L. Cheat or Chess.
Railroad tracks and waste ground near grain fields; common.

1028. *B. ciliatus*, L., var. *purgans*, Gray.
Moist woods; frequent.

1029. **B. tectorum**, L.
Sandy railroad embankment; Fairport. Rare.

Lolium, L.

1030. **L. perenne**, L. Darnel.
Escaped from lawns; Eldridge, Muscatine.

Agropyrum, Gaertn.

1031. *A. repens*, Beauv. Couch- or Quick-Grass.
Railroad tracks; common. Becoming a troublesome weed.

Hordeum, Tourn. Barley.

1032. *H. jubatum*, L. Squirrel-tail Grass.
Common.

1033. *H. pratense*, Huds.
Our plants of this species belong to *H. pusillum*, Nutt.
Dry sandy soil along railroads; infrequent.

Elymus, L. Wild Rye.

1034. *E. Virginicus*, L.
Waste land; common.

1035. *E. Canadensis*, L.
With above; common.

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1036. *E. Canadensis*, L., var. *glaucifolius*, Gray.
With above; infrequent.

1037. *E. striatus*, Willd., var. *villosus*, Gray.
Wooded hillsides; frequent.

Asprella, Willd.

1038. *A. Hystrix*, Willd. Bottle-brush Grass.
Moist woods; frequent.

EQUISETACEÆ.

Equisetum, L. Horse-Tail. Scouring Rush.

1036. *E. arvense*, L.
Common in sandy soil.

1040. *E. hyemale*, L. Shave Grass.
Common in wet soil.

FILICES.

Polypodium, L. Polypody.

1041. *P. vulgare*, L.
Rock ledges, Wild Cat Den.

Adiantum, L. Maidenhair.

1042. *A. pedatum*, L.
Shady woods; frequent.

Pteris, L. Brake.

1043. *P. aquilina*, L.
Thickets and open woods; frequent.

Pellæa, Link. Cliff Brake.

1044. *P. atropurpurea*, Link.
Limestone ledges; Wyoming Hill, Montpelier, and Devil's Glen.

Asplenium, L. Spleenwort.

1045. *A. ebeneum*, Ait.
Open sandy woods; rare. Muscatine county.

1046. *A. thelypteroides*, Michx.
Wild Cat Den.

1047. *A. Filix-foemina*, Bernh.
Moist woods; frequent.

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Camptosorus, Link. Walking Leaf.

1048. *C. rhizophyllus*, Link.
Wild Cat Den; on sandstone ledges.

Phegopteris, Fee. Beech Fern.

1049. *P. polypodioides*, Fee.
Wild Cat Den; rare.

1050. *P. hexagonoptera*, Fee.
Rich woods; frequent.

Aspidium, Swartz. Shield or Wood Fern.

1051. *A. Thelypteris*, Swartz.
Boggy places and marshes; frequent.

1052. *A. spinulosum*, Swartz.
Wild Cat Den; rare in other localities.

1053. *A. cristatum*, Swartz.
Boggy places in Cedar River region and other localities; rare.

1054. *A. Goldianum*, Hook.
Wild Cat Den.

1055. *A. acrosticoides*, Swartz. Christmas Fern.
Ravines and shady banks in woods; frequent.

Cystopteris, Bernhardi. Bladder Fern.

1056. *C. bulbifera*, Bernh.
Moist shaded places; infrequent.

1057. *C. fragilis*, Bernh.
Rocky woods; frequent.

Onoclea, L.

1058. *O. sensibilis*, L. Sensitive Fern.
Low moist places; common.

1059. *O. Struthiopteris*, Hoffmann.
Low rich woods; Wild Cat Den, Moscow.

Woodsia, R. Brown.

1060. *W. obtusa*, Torr.
Rocky places; infrequent.

Osmunda, L. Flowering Fern.

1061. *O. regalis*, L.
Semi-boggy places in Cedar River region. Local, becoming very rare.

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1062. *O. Claytoniana*, L.
Hilly woods; frequent.

1063. *O. cinnamomea*, L. Cinnamon Fern.
Boggy places in Cedar River region; local.

OPHIOGLOSSACEÆ.

Botrychium, Swartz. Moonwort.

1064. *B. Virginianum*, Swartz.
Rich woods; frequent.

LYCOPODIACEÆ.

Lycopodium, L. Club Moss.

1065. *L. lucidulum*, Michx.
Wild Cat Den and Cedar River region; rare.

1066. *L. complanatum*, L. Ground Pine.
Collected in 1892 in woods east of Wild Cat Den.

SELAGINELLACEÆ.

Selaginella, Beauv.

1067. *S. rupestris*, Spreng.
Sandy soil near Cedar River; local. Among clumps of *Opuntia Rafinesquii*.

SALVINIACEÆ.

Azolla, Lam.

1068. *A. Caroliniana*, Willd.
Floating on water, Muscatine Slough.

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Cnicus Hillii, Canby. Garden and Forest 4:101, 1891.

Observations made since the publication of this species in 1891, and accurate drawings, furnish material for a more complete description and understanding of this thistle, which well maintains its claim to specific rank.

Plant perennial, 1—2 feet high, leafy, simple or branched, villous pubescent or somewhat woolly. Root 8—15 inches long, simple or fasicled (1—4), generally perpendicular, the parts fusiform or the middle portion more or less enlarged and hollow or coarsely cellular, slender above. Leaves sinuate lobed to pinnatifid, or the lower undulate, the lobes rather broad and rounded, green both sides, acute or the lower obtuse, dentate, spinulose or with a few short prickles; the upper oblong to oblong-lanceolate, sessile and clasping; the lower oblanceolate to spatulate-oblong, narrowed at the base, or the lowest petioled and 6—8 inches long. Vernal and autumnal leaves rosulate, oblanceolate-oblong, entire or slightly undulate, with short and weak marginal prickles, or sometimes with stouter yellowish prickles. Heads 1—3 (1—5), frequently single, 2—3 inches broad, 2—2½ inches high. Outer involucral bracts ovate-lanceolate, tipped with a short bristle or prickle, with a dark and prominent glutinous line along the back, inner, narrowly lanceolate, long acuminate. Flowers purple, pappus slender pointed or sometimes slightly spatulate.

Fields and open woods. June 20—Aug. 1.

The main distinctions between this and the pasture thistle (*Cnicus pumilus*, Torr.), its nearest ally, and with which it was at first confounded, are the duration and form of the root, that of the pasture thistle being biennial and branched, while in this it is perennial, simple, with a few rootlets, mainly on the lower half; its less spinescent and less deeply lobed or divided leaves; the bracts of the involucre more glutinous; their weaker tips which are scarcely prickly except in the lowermost; the longer and more slender pappus; the earlier flowering season, the first half of summer, while that of *C. pumilus* is the latter half. The leaves of the pasture thistle cover the stem well up to the head to which they may form a kind of involucre, while those of *C. Hillii* are few and small near the head, or the stem may

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be bare for an inch or two. The form of the root is a very safe means of identification at any season when it can be found. If more than one they are similar in shape and all spring from the base of the stem. Its habits are like those of the pasture thistle, growing in fields and meadows, and it seems to take the place of that species in the central and western states, and may fitly be termed the western pasture thistle.

E. J. HILL.

Quercus ellipsoidalis, E. J. Hill. Botanical Gazette 27:205, 1899.

Trees 30—60 feet high, 1—3 feet in diameter, the head oblong, spray repeatedly and finely dividing, the limbs usually coming low down on the trunk, the lower drooping. The bark is close, quite smooth, ½ — 1½ in. thick, divided by shallow fissures into narrow, thin, flat plates, 2—6 in. long. It is dark near the base, dull gray above, grayish brown and quite smooth among the branches, dull red within, with a thin band of yellow next the wood. The winter buds are small, ⅛—¼ in. long, ovate, obtuse or acutish, with a rusty or grayish pubescence. The leaves are broadly oval to oval-orbicular or somewhat obovate orbicular in outline, 2½—6 in. long, 1½—5 or more wide, lustrous green and smooth above, lighter green and smooth beneath or with slight tufts of pale hairs in the axils of the principal veins, and are deeply cut into 5—7 lobes by broad and rounded sinuses which extend half way or more to the midrib. The base is bluntly cuneate or truncate, petioles rather slender, 1—2 in. long, generally tinged with red on the upper side. In autumn the leaves are yellowish to pale brown, often blotched or tinged with purple or sometimes of a vinous or crimson purple. They are quite persistent on the trees in winter. The aments are long and slender, loosely flowered pubescent. Calyx campanulate, variously cut into 2—5 segments which are fringed with long hairs. Stamens 4 or 5; filaments shorter than the anthers. Pistillate flowers on stout tomentose 1—3 flowered peduncles, the calyx variously divided into 5—7 parts, the margin laciniate-hairy. Styles 3, thick and flattened, spreading or recurved. Acorns single or in pairs, the cup turbinate or cup-shaped, thin, or in some thickened and rounded near the margin, covering ⅓—½ the nut. The cup scales are brownish, more or less puberulent, closely appressed, occasionally loosening a little near the rim on

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drying. Nut chestnut brown, often striped with darker lines, ½—¾ in. long, ellipsoidal to oval-cylindrical, or when short and broad oval-globular, the base and apex mostly rounded about equally. The kernel is pale yellow and bittter.

Q. ellipsoidalis more closely resembles *Q. palustris* in general appearance than any other of the biennial-fruited oaks. This is seen in the comparative smoothness of the bark, the depression of the lower limbs, which descend low down on the trunk except when much crowded in dense woods; and in the finely divided leaves and general character of the branching. But it differs in the form of the leaf-lobes, in the color of the bark, and especially in the form and size of the nut and acorn-cup. The lower branches, though long persistent, die and fall off like those of the pin oak, but do not leave the stubs so characteristic of that species. It resembles *Q. coccinea* in the form of some of its acorns, in the lobation of the leaves and reddish color of the inner bark, but the outer bark is darker and generally much smoother than on trunks of the scarlet oak of similar age and size, and the leaves do not turn scarlet in autumn. *Q. velutina* is suggested by the darker color of the bark near the base of the trunk, the band of yellow next to the wood, the dull color of the autumn leaves, the hairs in the axils of the veins beneath, though this is a feature of *Q. palustris* and is frequent in *Q. coccinea;* but the bark is not rough and black, a character that appears very early on boles of the black oak; the yellow of the inner bark is usually much less in amount, the acorns differ in shape, and especially in the loosened or squarrose densely puberulent scales of the cup.

E. J. HILL.

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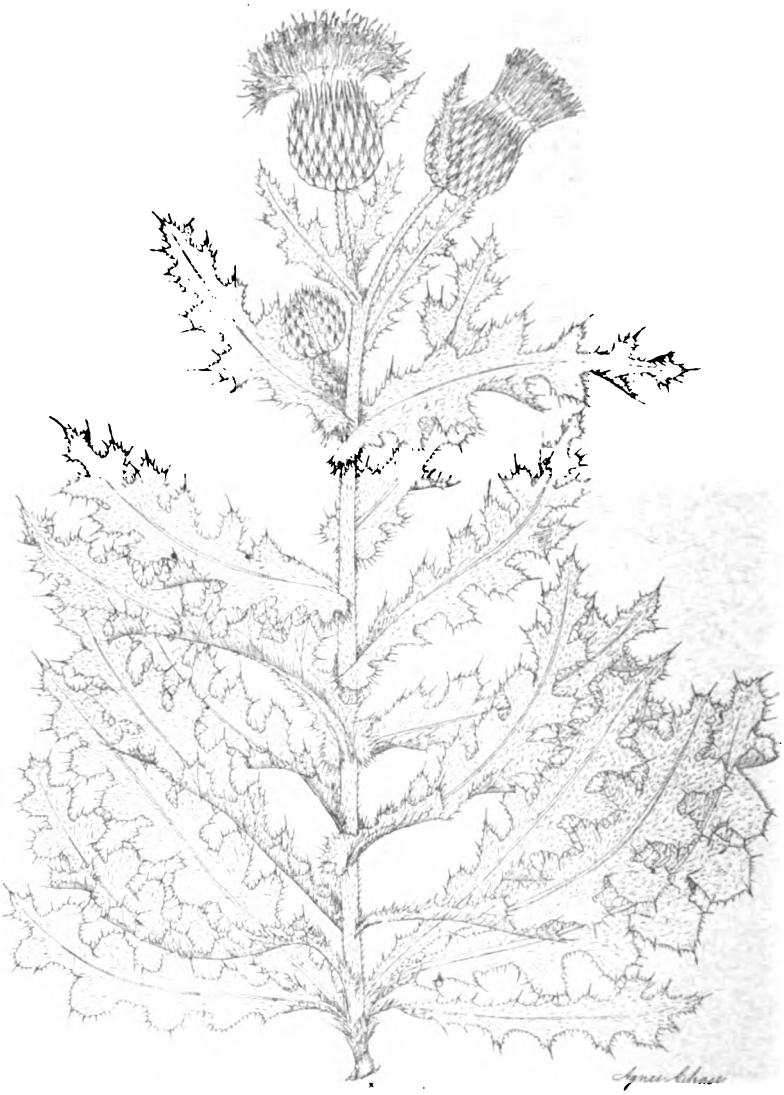

PLATE I.

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PLATE I.

CNICUS HILLII, Canby. One-third natural size.

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PLATE II.

FIG. 1. Root of plant illustrated in Plate I. One-third natural size.
FIG. 2. Fascicled root. Two-ninths natural size.
FIG. 3. A root. One-third natural size.
FIG. 4. Vernal plant. One-third natural size.
FIG. 5. Outer involucral bract. Two-thirds natural size.
FIG. 6. Inner involucral bract. Two-thirds natural size.
FIG. 7. Flower. Two-thirds natural size.
FIG. 8. Achene and pappus. Two-thirds natural size.

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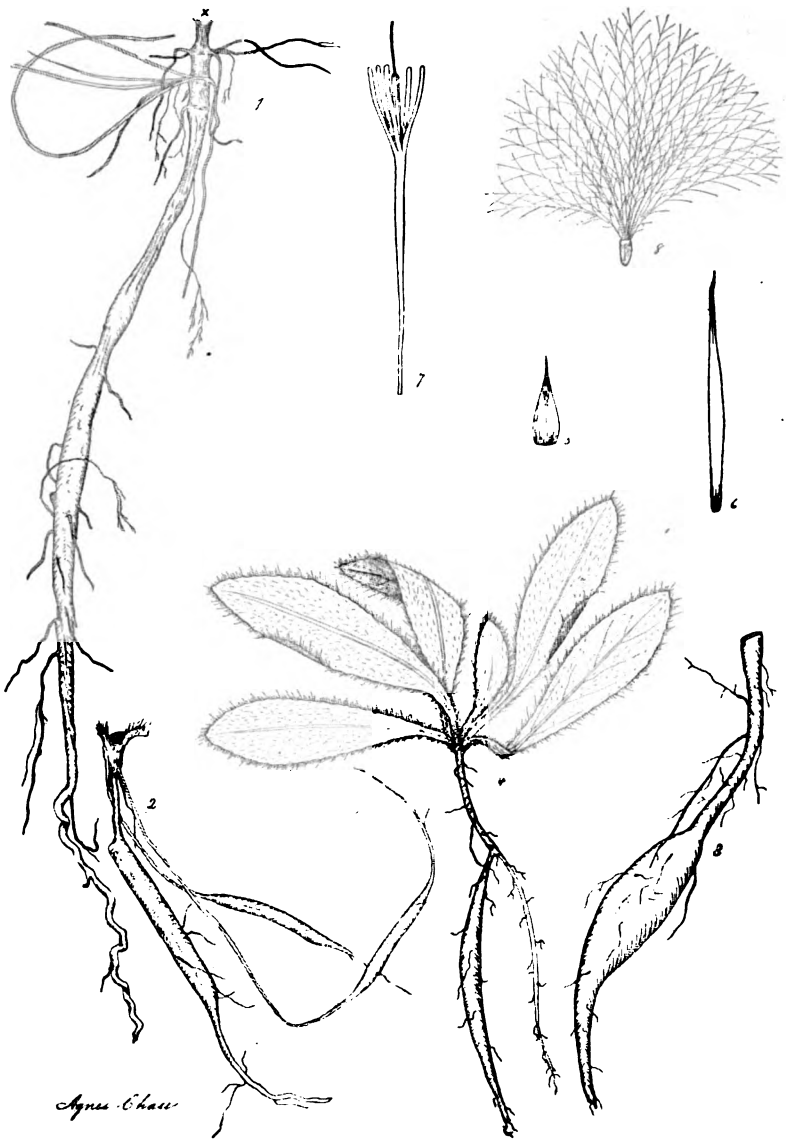

PLATE II.

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SYNOPSIS OF PROCEEDINGS

OF THE

DAVENPORT ACADEMY OF SCIENCES.

1899—1900.

January 18, 1899—ADJOURNED ANNUAL MEETING.

President Edward S. Hammatt in the chair. The minutes of the Annual Meeting, January 5, 1898, were read and approved and the annual reports of the various officers were presented.

The annual report of the Recording Secretary, E. M. White, showed that during 1898 there were ten regular monthly meetings of the Academy and three meetings of the Board of Trustees. Five honorary, two life and six regular members were elected, while one life and two regular members died.

The Librarian, C. E. Harrison, reported 2,099 accessions to the library. In addition to the books obtained by exchange the library was enriched by forty volumes on geology and palæontology, all new to the library and of great value for scientific work, from the library of Prof. W. H. Barris, presented by Miss Elizabeth D. Putnam; sixty-one volumes, some of them rare, from Dr. S. C. Bowman of Andalusia, Ill.; and sixty-seven volumes from a private scientific library in Davenport which will eventually come to the Academy. The entomological library of J. Duncan Putnam, numbering 270 volumes, was catalogued by Miss Alice Beach and the entire library overhauled, cleaned and arranged preparatory to cataloguing and binding. Attention was called to the necessity of completing this work in order that the library may be made of greater service.

The Treasurer, Mrs. Mary L. D. Putnam, reported that on account of the unusual expenses for fitting up and rearranging the library, purchasing new cases and cleaning and rearranging the museum, it had been necessary to borrow $342.52. During the year one-half of

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the $5,000 necessary to purchase the Presbyterian church property adjoining the Academy was subscribed, but efforts in that line were temporarily suspended on account of the Spanish war. The report laid emphasis on the demand for an increased endowment fund.

Below is given a synopsis of accounts for 1898:

GENERAL FUND.

RECEIPTS.

Balance on hand Jan. 1, 1898	$ 14.88	
From Dues	180.00	
Initiation fees	35.00	
Interest	91.85	
Sale of case	25.00	
Annual subscriptions	415.00	
Donations	182.94	
Advanced by Mrs. M. L. D. Putnam	92.52	
Advanced by Miss E. D. Putnam	50.00	
Advanced from publication fund	200.00	
Door admission	46.66	$1,333.85

EXPENDITURES.

Salary W. H. Barris, Curator	$ 500.10	
M. Mathews, Janitor	82.02	
Insurance	90.00	
Lights	15.53	
Fuel	53.99	
Water	16.00	
Repairs to furnace	12.00	
Repairs to sidewalk	21.19	
Miscellaneous supplies	5.80	
Printing	7.75	
New cases for museum	207.00	
Shelves, labels, etc., for library	76.01	
Rearranging library	111.70	
Postage and express	32.85	
Cleaning and arranging museum	72.37	
Total expenses, 1898	$1,304.31	
Amount in bank	15.73	
Amount with Curator	13.81	$1,333.85

As chairman of the Publication Committee, Mrs. M. L. D. Putnam reported that during the year five papers had been published and that Volume VII. of the Proceedings was nearing completion. Financially the Publication Fund was in excellent condition. The papers published were:—

"Studies of North American Jassoidea," by Herbert Osborn and Elmar D. Ball, 66 pages, six plates drawn by Charlotte M. King, and six pages explanatory of plates, used by courtesy of Iowa Experiment Station.

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"Notched Bones From Mexico," by Frederick Starr, 10 pages, four plates.

"The Genus Pediopsis," by Herbert Osborn and Elmer D. Ball, 28 pages.

"Contribution to the Entomology of New Mexico," by T. D. A. Cockerell, 18 pages.

"Supplement to a Revision of the Melanopli," by Samuel H. Scudder, 64 pages, three plates.

Another paper, "Notes on the Habits of Our Tiger Beetles," by H. F. Wickham, is on hand.

The report on the Publication Fund for the year 1898 is given below:

RECEIPTS.

Balance in bank Jan. 1, 1898	$ 11.78	
Sale of Proceedings	50.80	
Interest on Putnam Memorial Fund	427.50	
Interest on bank deposit	2.09	
Advanced by Mrs. M. L. D. Putnam	100.00	$ 592.17

EXPENITURES.

Edward Borcherdt, printing	$ $238.30	
Egbert, Fidlar & Chambers, binding	87.50	
Advanced to General Fund	200.00	
Total expenses, 1898	$ 525.80	
Balance in bank	66.37	
	$ 592.17	$ 592.17

Dr. Elmer was called to the chair and the President delivered his annual address.

PRESIDENT'S ANNUAL REPORT.

EDWARD S. HAMMATT, January 18, 1899.

Members of the Academy, Ladies and Gentlemen:

Can we look back on the year just closed with satisfaction at the progress we have made in the development of the fundamental ideas of this society as expressed in its title, "Academy of Natural Sciences?" What have we done to increase man's knowledge of nature or love for nature study? We may embrace these questions in one and answer them in an account of the Academy work during the past year. The statistical reports of the Publication and Finance Committees show that the first part of Volume VII. of the Academy Proceedings is nearly ready for distribution. Material is available and in the hands of the printer for beginning the second part. The Finance Committee's report indicates the necessity of establishing endowment funds for the various branches of the Academy work. The Curator

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reports that over twenty donations, embracing a large number of specimens, have been added to our Museum collection, making it imperative that arrangements should soon be made for future additions to the Museum space.

Attention must again be called to our list of Corresponding Members. This list should be revised as soon as possible and corrected lists of Honorary, Life, Corresponding and Regular Members kept posted in the Curator's office. Corresponding Members should be required to notify the Academy of their location once a year.

We find from the Librarian's report that the Library has received some 2,099 accessions in foreign and American exchanges. A Library fund is necessary before we can bind and catalogue the Library or make its treasures available for public use. The floor space in the Library heretofore used for lecture audiences has been given up to a number of cases containing most of our collection of Ornithology.

It is clear from these reports that the capacity of our building is near its limit. We are forced to seek other quarters for Academy lectures. Adjacent property, with a building which would serve for some time as a lecture hall and store room, is available by purchase. A special committee is making progress toward this end.

The steady growth and prosperity of this city demands that we keep the Academy equipment abreast of the times with facilities for active work. The Academy has in the past, and must in the future, keep well in advance of the situation. The annual reports just presented give a fair statement of the Academy work during the past year. But they do not include a report on educational work, such as the name "Academy of Natural Sciences" would indicate as of preeminent importance. We have not advanced nor taken the lead we should in such matters. The spirit of a new century is already beginning to awaken us to better methods in every branch of human progress. Science, and especially natural science, is the great motive power now working out a complete revolution in the aims and methods of modern thought, both as regards mental and moral instruction. Scientific methods are now applied to every branch of study. The closing year of the nineteenth century finds Religion and Science, so far asunder at its beginning, closely united in the great struggle for the uplifting of humanity. And today we accept Science teaching as the most adequate method of imparting moral instruction by bringing the child face to face with the great truths of nature. It is with this end in view that those interested in the Academy have repeatedly urged a closer relation between the Academy and the public schools. It is a simple duty we owe this community, that from our Academy should go forth a powerful influence for building up of character by means of nature study.

In a previous annual report your attention was called to the importance of a uniform system of weights and measures for scientific as well as commercial purposes. Your indulgence may be asked in again

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considering the question in view of the fact that this year may see the adoption by the United States government of the system now in almost universal usage. It seems strange that Great Britain and the United States, the two most enlightened of civilized nations, should be among the last to adopt measures which will not only put them in touch with the advance of science in other countries, but will effect a great economic reform in commercial transactions. A measure known as the Hurley Bill was introduced in the Fifty-fourth Congress and failed to pass by only three votes. It is now on the House calendar and is quite likely to become a law during the present session of Congress. This bill is entitled "A Bill to fix the standard of weights and measures by the adoption of the metric system of weights and measures" and provides "That from and after the first day of July, nineteen hundred, all the departments of the Government of the United States, in the transaction of all business requiring the use of weight and measurement, except in completing the survey of public lands, shall employ and use only the weights and measures of the metric system, and from said first day of July, nineteen hundred, the metric system of weights and measures shall be the legal standard of weights and measures recognized in the United States." The adoption of this measure is opportune—just as we are entering upon a period of territorial expansion and opening up commercial relations with distant colonies which will use American products and serve as distributing stations for our exports to other countries. The metric bill now pending before Congress is of such great importance that it may be of interest to recall some of the facts leading to the adoption of the system by the United States and our own connection with the international metrological movement. It is a singular coincidence that while the United States Government, then in its infancy, was considering a plan of unification of weights and measures, France was investigating the same problem. In 1790 Talleyrand, in view of the great diversity of weights and measures then in use in France, proposed to members of the Constituent Assembly that "either the old system should be reformed or a new universal standard be adopted." It was decided to have the French Academy of Sciences fix upon an invariable standard for weights and measures. Borda, Lagrange, Laplace, Minge, and Condorcet were chosen as a committee to report upon the selection of a standard. After considering the pendulum beating seconds, a quadrant of the equator, and a meridian quadrant, they selected the ten-millionth part of a quadrant of the meridian as a standard unit of linear measure. On August 1, 1793, the metric system was provisionally adopted by the National Assembly of France and on April 7, 1795, the nomenclature the system now bears was adopted. In the United States Washington, realizing the necessity of a uniform system, introduced the subject in his message to the First Congress, saying: "Uniformity in the currency, weights and measures of the United States is an object of great importance and will, I am persuaded, be

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duly attened to." The subject was referred by the House of Representatives to Jefferson, then Secretary of State, for a report, which was made in July, 1790. When it became known that France was considering the same question, the Senate committee to whom had been referred Jefferson's propositions decided that it was best not to introduce any alterations in the standards then in use. Washington, in his address to the Second Congress, again urged the need of action. The subject was next brought to public attention by Madison. This portion of the President's address was referred by the Senate to John Quincy Adams, Secretary of State, who submitted his plan February 22, 1821. He advised consultation with foreign nations for the future and ultimate establishment of universal and permanent uniformity. No further action was taken till 1828, whan an Act was passed legalizing a Troy pound as standard for the use of the mint. It was not till July 27, 1866, that the metric system was legalized by act of Congress. The passage of this Act was largely due to Hon. J. A. Kasson of Iowa, chairman of the House committee on coinage, weights and measures, who strongly urged the adoption of the measure in Congress and before the Convocation of the University of New York. In 1873 a committee of the British Association for the Advancement of Science was appointed to "select a nomenclature for dynamical and electrical units," with the intention of making them international. The gramme, centimetre, and second of time were chosen and have been adopted by all scientific men. As the use of the metric system became more general, in order to insure the preservation of metrological prototypes certain nations, among them the United States, agreed by a treaty signed in 1875 to establish an International Bureau of Weights and Measures at Paris. The administration and maintenance of this Bureau is vested in an international committee appointed by the twenty-nine nations that have become parties to the treaty of 1875. The work so far accomplished by the Bureau has been to construct the standards, which have been distributed to the nations forming the Bureau. In addition to this a standard decimal thermometric scale and normal barometer have been constructed. The metric system is in use in the United States Coast and Geodetic Survey and it is to be hoped that our government, after having endorsed the metric system as the best for international usage that has been devised, and a system that has proved adequate for all purposes, will at least require its use in all government transactions. We should, as an Academy of Science, do all in our power to enlist the hearty coöperation of Congressional representatives from Iowa in enacting necessary legislation. Hon. Charles W. Stone, chairman of the Committee on Coinage, Weights and Measures, says in his report to Congress, June 20, 1898: "Put the system in practical and uniform operation in the transactions of the government and the adoption by the people will take care of itself. Its merits will be brought home to them in a practical way and knowledge will inevitably bring approval. No compulsion of the

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people is contemplated and none will be necessary. The system of the government of the people will speedily and easily become the system of the people."

It is with regret that we are called upon to record the loss of several members within the past year: Rt. Rev. William Stevens Perry, Second Bishop of Iowa, and Mr. A. J. Smith, both members of several years' standing; Mr. M. Frahm, a member and generous subscriber to the Academy work; Dr. S. C. Bowman of Andalusia, whose interest in the Academy is testified by many additions to the Museum; Major George P. McClelland, one of our life members, who for many years and up to the time of his death took an active part in the Academy work, serving on many important committees and at various times as trustee and treasurer. We can ill afford to lose a member so much interested in the Academy and so well qualified to appreciate its value.

In closing this report, allow me to express my appreciation of the repeated honor conferred upon me, and to return thanks to the more active members, with whom it has been a pleasure to work.

The reading of these reports was followed by the election of the following officers for the year 1899:

President—CHARLES FRANCIS.

First Vice-President—DR. A. W. ELMER.

Second Vice-President—C. A. FICKE.

Recording Secretary—E. M. WHITE.

Treasurer—MRS. M. L. D. PUTNAM.

Corresponding Secretary—W. H. BARRIS.

Librarian—C. E. HARRISON.

Curator—W. H. BARRIS.

Trustees for Three Years—E. S. HAMMATT, EDWARD C. ROBERTS, W. C. PUTNAM, J. F. LARDNER.

The following Honorary Members were elected: Prof. S. Calvin, Prof. T. H. McBride, Prof. C. C. Nutting, all of the State University of Iowa.

January 27, 1899 — REGULAR MEETING.

President Charles Francis in the chair; six members present.

The Curator reported the following additions to the Museum:

From Capt. Hall, purchased by the Mound Fund, 103 flints, one large grooved stone axe, remarkable in material and perfection of workmanship and finish, one long celt wrought of entirely different stone.

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The Committee on Resolutions reported the following, which was adopted and entered on the minutes:

The Davenport Academy of Natural Sciences takes this occasion to put upon record its profound sense of bereavement in the death of Major George Pressley McClelland. For a quarter of a century or more he has been one of its main supporters. He was among its most generous patrons. In 1883, with Hon. George H. French and Nicholas Kuhnen, he raised some $3,000 for the debt and endowment of this institution. He was a most faithful trustee and treasurer. He secured Prof. Richard A. Proctor and other lecturers for the Academy course and in countless ways labored for the advancement of science. We mourn the loss of a citizen whose character was pure and lofty. We lament the departure of a friend whose gentle manners and courtly carriage won the love of all who knew him.

JOHN B. DONALDSON.
MARY L. D. PUTNAM.

The following committees were appointed for 1899:

Finance—W. C. Putnam, J. B. Phelps, C. A. Ficke.

Publication—Mrs. M. L. D. Putnam, Prof. W. H. Barris, Prof. S. Calvin, Dr. C. H. Preston.

Archæology—C. E. Harrison.

Geology—Prof. W. H. Barris.

Conchology—Miss S. F. Sheldon.

Zoölogy—Dr. A. W. Elmer.

Botany—A. A. Miller.

Entomology—Prof. H. B. Osborn.

Library—C. E. Harrison, Charles Francis, E. M. White.

February 24, 1899—REGULAR MEETING.

President Francis in the chair; seven members present.

The Curator reported the following additions to the Museum:

From Albert P. Morse of Wellesley College a collection of new American Odorota and, to the Library, his paper containing a full description of the same, a paper on "The Study of New England Species of Spharagenion," and four papers entitled "Notes on the Acridæ of New England." Dr. Scudder has presented the original drawings from which were engraved the illustrations of his paper, just published in Volume VII. of the Proceedings of the Academy. From George R. Putnam, a collection of Eskimo implements, including spears five or six feet in length, furnished with bone sockets and detachable ivory points, adapted to different kinds of game, birds and fish. They were accompanied by a throwing stick by which a powerful momentum is given the spear.

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February 28, 1899 — TRUSTEES' MEETING.

President Francis in the chair; seven Trustees present.

A general discussion as to the advisability of purchasing the First Presbyterian church property adjoining the Academy led to the adoption of a resolution presented by C. A. Ficke, as follows:

Resolved, That the committee be authorized to close the contract for the purchase of the property of the Presbyterian Church on the northwest corner of Seventh and Brady streets, Davenport, Iowa, for the sum of $5,000, of which sum the church propose to furnish $500 in the shape of five Life Members at $100 each; an amount of $500 to be paid to the Trustees of the Presbyterian Church to secure the property, and the balance to be paid on the surrender of the property to the Academy.

March 31, 1899 — REGULAR MEETING.

President Francis in the chair; six members present.

The Curator reported the following gift:

From J. L. Bean of Rock Island two well-preserved specimens of wood taken from wells thirty feet deep at Hampton and Andalusia, Illinois.

The Treasurer reported that $2,325 had been collected from subscribers to the church fund and $2,300 paid to the trustees of the church, on account.

The following papers for publication were read by title:

"The Flora of Scott and Muscatine Counties," by W. D. Barnes, Fred Reppert and A. A. Miller.

"The Grasses of Northern Wyoming," by Prof. L. H. Pammell.

"The Fungi of Northern Wyoming," by Prof. H. H. Hume.

Dr. C. H. Preston, chairman of the Committee on Membership, reported the completion of an alphabetical list of all elections to membership—Honorary, Corresponding, Regular and Life—from the foundation of the Academy to the present time, together with a working list of the present members so far as it could be made out without further action of the Academy. He recommended that the Academy remit the dues of delinquents who desire to renew and continue active membership. He also recommended that the list of members be published in the Proceedings.

On motion the rules were suspended and the following were elected Life Members: C. A. Ficke, Mrs. C. A. Ficke, Anthony Burdick, George W. Cable, Hon. Hiram Price, Richard Andresen, Edward C.

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Crossett, John L. Zoeckler, Paulo Roddewig, J. J. Richardson, Edward C. Roberts, Thomas Iles, Jr., Harry Vollmer, Jr., Charles E. Harrison, Dr. W. H. Barris, Miss Bessie Ballord, Miss Nellie Leonard, James T. Robinson of Rock Island.

On motion a lecture committee was appointed, consisting of Chas. Francis, Dr. C. H. Preston, C. A. Ficke, Charles E. Harrison, and E. M. White.

April 28, 1899— REGULAR MEETING.

President Francis in the chair; six members present.

The Curator reported the following gifts to the Museum:

From Capt. Hall, purchased from the Mound Fund, nearly 100 flint implements. From Mrs. Alice Hornby, a large, thick mass of petrified wood, preserving peculiarities of structure. Its upper surface is capped with layers of pure anthracite coal a few inches in thickness and this in turn is encrusted with a silicious deposit preserving and protecting the coal in place. Also a well preserved specimen of the bone of some extinct animal, most probably the elephant, converted into stone. It seems to be the entire top of the articulating surface of the humerus. Both specimens are from western Nebraska, having been sent from Valentine.

Prof. Frederick Starr's paper, "Ethnography of Southern Mexico," was read by title and referred to Publication Committee.

July 28, 1899 —REGULAR MEETING.

President Francis in the chair; seven members present.

The Curator reported additions to the Museum for three months as follows:

From W. H. Barris, a fine specimen of the crustacean known as *Euripterus remipes* of DeKay, from the waterlime group of New York, Black Rock, N. Y.; also a fish from the tertiary of Mount Herman, Palestine. From Prof. J. A. Udden, three bottles of diatom-bearing earth, the first from under the loess on the farm of W. B. Verick in Cedar township, Muscatine county, Iowa; the second from under trees at Davenport; the third from under the loess three miles north of Wapello, Louisa county, Iowa. From Miss Clara Holmes, a number of books, a large glass bell case, and a Cupid drawn on a spiderweb.

The Library is indebted to C. E. Harrison for 56 pamphlets, historical works on Iowa.

It was moved and carried that the newly acquired building be reshingled, the same to be paid for out of the first available funds.

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W. G. Smith and Rev. G. S. Rollins were elected Regular Members. W. D. Barnes, Morgan Park, Ill., Prof. E. J. Hill, Englewood, Ill., and Rev. M. Kempke were elected Corresponding Members.

September 29, 1899—REGULAR MEETING.

C. A. Ficke, First Vice-President, in the chair; seven members present.

The Curator reported the following additions to the Museum for two months:

From Dr. C. F. Kellogg, Clinton, Iowa, an unusually large, fine specimen of a celt, locality unknown. From the Cemetery Association of West Davenport, a collection of rocks of very variegated character, found in an excavation on their grounds. Among them was a large, flat, finegrained sandstone in which were imbedded a series of good-sized pebbles of quartz and flint, mostly elongated, all rounded and deeply grooved. The peculiarities are, first, grooves in the same general direction; second, no evidence of their extension into the matrix. These pebbles are distributed through the whole thickness of the rock. The specimens deserve careful study. From G. N. Black, a unique specimen of rock of which, as yet, we know little. It seems to be composed of very fine, worn grains of quartz. This is compacted into forms that have a general resemblance to one another and yet are compressed into every possible shape. But order prevails, as each form retains throughout its length from ten to twenty divisions separated by deep furrows and distinguished by a remarkable discoloration of iron. From Mrs. Putnam, from Yellowstone Park, specimens of obsidian granite; petrified and agatized wood; hardened mud from a geyser, with characteristic mass, cones and leaves; from Salt Lake, brown salt rock used in a building of same material with pure white crystallized lining for the inside finish, small natural and large artificial crystals; from Leadville, crystals of lead, iron pyrites, and quartz. From Edward K. Putnam, well-preserved forms of the prevalent species of reptiles and insects from Shoshone, Idaho; an excellent impression of a fish from the Green Mountains; a tinder box, also a wooden sand box which our paper blotters have displaced, from Cape Cod, Massachusetts.

E. Dwight Sanderson's paper on the "Studies of the Immature Stages of Some Chrysomelina" was read by title and referred to the Publication Committee, as was also Samuel H. Scudder's paper on "Synonymical Catalogue of Orthoptera of the United States and Canada."

The following were duly elected Regular Members: Bishop T. N. Morrison, Horace Roberts, Dr. A. L. Hageböeck, John M. Helmick.

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October 27, 1899 — REGULAR MEETING.

E. S. Hammatt in the chair; seven members present.

The Curator reported additions to the Museum as follows:

From George R. Putnam, a large glass case containing life-sized forms of an Eskimo man and woman in full costume, with other Eskimo relics bearing on their customs and manner of living. From Benjamin R. Putnam, from Butte, Montana, specimens of silver, copper and other ores, and a series illustrating the process of smelting copper.

The Publication Committee reported that Volume VII. of the Proceedings was in the hands of the binder and that Volume VIII. was under way, Dr. Scudder's and Prof. Starr's papers being in the hands of the printer.

Ernest C. Oberholzer was elected a Regular Member.

October 27, 1899 —TRUSTEE'S MEETING.

Dr. W. H. Barris in the chair; five Trustees present.

The bid of the T. W. McClelland Company for roofing the church property, at an expense of $425.00, of which amount $100.00 is to apply for a Life Membership for Wilson McClelland, was accepted.

Mrs. M. L. D. Putnam was appointed a committee to conclude arrangements for repairs on the roof and removal of the tower on the church property.

January 5, 1900 —ANNUAL MEETING.

President Charles Francis in the chair; seven members present.

The reading of reports of officers was postponed until the next regular meeting.

The following officers for 1900 were elected:

President — MRS. M. L. D. PUTNAM.

First Vice-President — C. A. FICKE.

Second Vice-President — DR. A. W. ELMER.

Recording Secretary — A. A. MILLER.

Corresponding Secretary —PROF. W. H. BARRIS.

Treasurer — MISS ELIZABETH D. PUTNAM.

Librarian—C. E. HARRISON.

Curator—W. H. BARRIS.

The election of Trustees was postponed until the next regular meeting.

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January 26, 1900—REGULAR MEETING.

Edward S. Hammatt occupied the chair.

The annual reports of Recording Secretary, Librarian, and Curator were read at this meeting.

The report of E. M. White, Recording Secretary, showed that during the year 1899 there had been nine regular meetings of the Academy and two Trustees' meetings. During the year three Honorary, seven Regular, three Corresponding and nineteen Life Members were elected and one Life Member died.

C. E. Harrison, Librarian, reported that during the year there had been 1,587 additions to the Library. An event of unusual interest was the designation of the Academy as one of the permanent depositories, under the law of 1897, for all the maps issued by the United States Geological Survey. During the year the work of making a card catalogue was continued under the direction of Miss Alice Beach. Attention was called to the crowded condition of the Library and the need of more stack-room as well as space for reading tables.

The annual report of Dr. W. H. Barris, Curator, gave a summary of the various additions to the Museum during the year, a detailed enumeration of which is given in the reports of the regular monthly meetings.

As Corresponding Secretary Dr. Barris reported that during the year 1899 there were 246 letters written and acknowledgments made and 153 letters received.

The Curator reported the following additions to the Museum for November, December and January:

From Harry French, a terra cotta lamp, well preserved, ornamented with characters establishing its Greek origin. From Mrs Elizabeth Applewhite, a steel plate engraving of Washington in military costume. From George R. Putnam, a young elephant's tooth found in Alaska; an Alaskan representation executed in wood showing the mother seal carrying her young; two horn spoons made and in use by the natives; and an Alaskan ivory needle case. From Mrs. M. L. D. Putnam, highly ornamented Norwegian articles for household use and wear; and specimens of the work of the Indians of our National Park. From Henry Heim, a large colored engraving of Davenport as it was in 1850.

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April 27, 1900 — REGULAR MEETING.

The President, Mrs. M. L. D. Putnam, in the chair; seven members present.

The Librarian reported that 97 books and pamphlets and 11 bound volumes were presented by George R. Putnam.

The Curator reported the following additions to the Museum:

From George R. Putnam, a fine skull of a walrus with tusks, together with stone implements for cooking used by the Eskimos, all from Greenland; also implements for boring and fire making, and a large tusk of a walrus with etched drawings, all the work of the Eskimos of Alaska. From David C. Thomson, a crucifix fish from Dutch Guiana. From W. S. Price, a series of shells, most probably used by Illinois Indians as money. A representation of peculiar meteorological phenomena in January, 1900, taken by Karl Schmallhaus. From C. E. Harrison, a freak of a cottonwood root.

The President announced the following committees for 1900:

Archæology — Prof. Frederick Starr.

Geology and Palæontology — Prof. W. H. Barris.

Conchology — Miss S. F. Sheldon.

Zoölogy — Dr. A. W. Elmer.

Botany — A. A. Miller.

Entomology — Prof. H. B. Osborn.

Finance — W. C. Putnam, J. B. Phelps, C. A. Ficke.

Publication — Mrs. M. L. D. Putnam, Prof. W. H. Barris, Dr. C. H. Preston, Prof. Samuel Calvin, E. S. Hammatt.

Library — C. E. Harrison, Charles Francis, E. M. White.

Lectures and Entertainment — Mrs. J. J. Richardson, Bishop T. N. Morrison, Dr. J. B. Donaldson, E. S. Hammatt.

The following Trustees were duly elected to serve three years: C. E. Harrison, Dr. Jennie McCowen, Prof. W. H. Barris, A. F. Cutter.

The Publication Committee presented the following report:

The first form of Volume VII. was printed September 13, 1897, and the last form on March 1, 1900. Seventeen hundred copies have been completed, of which 1,200 are in paper, 300 in cloth, and 200 separates. The cost is $1,180, as follows:

Printing, including plates	$ 880.00
Portrait of C. E. Putnam	100.00
Prof. Scudder's plates	125.00
Binding	75.00
	$1,180.00

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The laborious work of preparing the list of members was done by Dr. C. H. Preston, while the preparation of the index was the work of J. A. Udden, Jr., assisted by his father. The Publication Committee is under great obligation to these gentlemen for the extreme care exercised in their work.

The Treasurer submitted the annual report for the year 1899, as follows:

GENERAL FUND.

RECEIPTS.

Balance on hand Jan. 1, 1899	$ 29.54	
From Dues	198.00	
Initiation fees	15.00	
Interest, Endowment	86.26	
Annual subscriptions	352.00	
Donations	228.75	
Loans	86.26	
Lecture	.70	
	$ 996.51	$ 996.51

EXPENDITURES.

Salary W. H. Barris, Curator	$ 458.39	
M. Mathews, Janitor	85.00	
Fuel	30.50	
Water	12.00	
Repairs	27.75	
Printing	5.50	
Postage	5.00	
Capt. Hall, Mound Fund	5.00	
W. H. Barris, books	70.75	
Church Fund, loan repaid	25.00	
Indebtedness paid	267.52	
Amount on hand Jan. 1, 1900	4.10	
	$ 996.51	$ 996.51

T. D. Eagal's paper on "The Early History of Davenport" was read by title and ordered to be filed.

On motion it was decided to give the name "Science Hall" to the Presbyterian church building recently purchased by the Academy.

On motion an amendment to Article I. of the Articles of Incorporation, by omitting the word "Natural" in the title of the Acadamy, was proposed and placed in the hands of the following committee for presentation at a later meeting: E. S. Hammatt, C. A. Ficke.

The President, Mrs. M. L. D. Putnam, read her inaugural address, as follows:

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PRESIDENT'S INAUGURAL ADDRESS.

MRS. MARY L. D. PUTNAM, April 27, 1900.

In accepting the presidency of the Academy for the second time, and after a lapse of twenty-one years, it would not be out of place for me to turn backward and review the noble record of devotion and achievement in the past. But my purpose is rather to look at the Academy as it exists today and to find wherein it can accomplish the most good.

An academy of science in a city like Davenport has many and varied functions to fulfill. One of these, the original object of this Academy, and perhaps its highest aim, is to be the center for active scientific work by those who devote their lives to science. In the thirty-three years of its existence the Academy has been such a center. It has reason to be proud of the scientific research and investigation done within its walls by such men as Professor Sheldon, Dr. Parry, Professor Pratt, Dr. Farquharson, J. Duncan Putnam, Dr. Barris, and many others. Let us be thankful for the past and let us be courageous enough to hope that in the rising generation there may be bright young men and women with observing eyes, with clear minds, and with devotion to the pursuit of truth — young men and women who will here do scientific work worthy of the world-wide reputation given to the Academy by its early members.

EDUCATIONAL OPPORTUNITIES.

This suggests that the Academy has a great opportunity before it in the line of education. It is not a teaching institution, but in other ways it can assist in the development of young eyes and minds.

Cordial relations should exist between the Academy and the public schools, St. Katharine's Hall, Augustana College, St. Ambrose College, and all the other educational institutions of Davenport and its vicinity, including the district schools of Scott county. Every opportunity should be offered for the students of these schools and colleges to come to the Acadamy, to become interested in the museum, to learn by observing. Members of the Academy can accomplish much good by being present on such occasions to explain the collections in which they are specially interested. Afternoon or evening talks, illustrated by actual specimens or by lantern slides, as the case may be, would arouse more interest in the students than whole rows of text books. So, too, the Academy might coöperate in planning excursions to points of natural interest, where the students may see for themselves how valleys are made, learn to know a glacial deposit when they see it, and may appreciate animal and vegetable life in its natural conditions. How otherwise can the physical geography of the country about Davenport be taught, and what does physical geography amount to unless taken out of the books and applied to the region that is best known? Excursions of this sort, for old as well as young, are regular features

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in the programme of the Geographical Society of Washington and of the Appalachian Club of Boston.

A dozen or so years ago the Academy became the headquarters of the local chapters of the Agassiz Association. Here were held the weekly meetings at which observations were reported and papers read and discussed. Here, as a result of excursions to the haunts of nature, was begun an embryo museum, not perhaps valuable in itself but of the greatest value in teaching classification and arrangement. Here the would-be scientists—most of them students of the High School—gathered their younger brothers and sisters and friends and helped them organize a junior chapter, an extension movement which was of benefit to all concerned. In course of time the Agassiz chapters ceased to exist, but not until they had accomplished abundant good. Some of the members have maintained their personal interest in natural history or science, but even those who have not, frequently testify that their dabbling in science was not all play; that it had an educational value not to be slighted. A similar organization among the students of today might well be encouraged.

VALUE OF THE MUSEUM.

It is hard to overestimate the educational value of a museum. One function of a museum is to bring together a scientific collection for the purpose of study by specialists, and to preserve those relics of a past race which would otherwise become scattered and lost. Thanks to its early devoted members, its indefatigable collectors and to its generous contributors, the Academy has a scientific museum that has attracted specialists not only from the east and west of our own country, but also from distant Europe. Aside, however, from this strictly scientific value of the museum, there is a popular and educational one. The laboring man in Paris who spends an hour in the Louvre to warm his hands and feet certainly absorbs something from the art treasures spread out before him. Who can tell how much good our own museum has done to those who have drifted in merely to kill time, or because some friend has told them about it? Surely eyes have been opened and the breadth of vision broadened. How much more Egypt means to the boy who has seen the mummy! How much more real are the mound-builders to us who know their animal pipes, their axes of copper covered with cloth! How much nearer to us is the Eskimo when we look upon his kayak, his fire-making tools, and the fur-seal which he hunts! As with primitive and distant man, so with nature. What can teach the ages and growth of the world so well as the rocks and fossils? And what undying interest there is in the cases of birds. The presence of such a museum in Davenport is a boon that we cannot too highly appreciate. To accomplish the greatest good, however, very much remains to be done. Owing to the lack of space in the building, boxes of specimens have never been opened. The purchase of the church property will afford some tem-

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porary relief, but the time is not far distant when a new and absolutely fire-proof building, fully equipped with new cases adapted for the preservation and display of specimens, will be a necessity. In the meantime, however, much can be done. The cases need a thorough overhauling and in many instances the specimens need to be reclassified and rearranged, while many labels need to be rewritten. Crowded cases can be relieved by displaying typical specimens and preserving the others for special study. The boy or girl who comes to the Academy to identify a bird he has seen in the yard should be able, as soon as he finds the corresponding specimen here, to learn its common and scientific name, its family and its habitat. The boy who reads in the life of Boone about a beaver should be able to come to the Academy and see a stuffed beaver.

It is interesting to watch the children in the South Kensington museum, in London, flock about a case placed there for their especial benefit, containing the commonest butterflies properly named. Interesting, too, it is to watch older students studying the cases in which types of the orders are scientifically arranged, and under them types of the families in each order, all clearly labeled, and forming a graphic and indelible lesson. Let us, in our humble way, follow the lead of that great London museum and encourage our young students to observe, to compare and to study.

THE HISTORICAL DEPARTMENT.

There is another department of the museum in which the Academy has made a beginning but in which more can be done. This may be called the historical. It is natural for man to be interested in historical trophies, in a tattered flag carried through a war, in a sword captured from the enemy. There is interest even in the weather-beaten wooden ball that topped the flagstaff of the old court house.

No less interesting are the objects connected with our every-day life, objects which we scorn to preserve, but which in a generation become rare and curious. How many of the children of to-day, for instance, ever saw a tinder box? When they read about a tinder box they may ask their grandmother and she may say that she saw one in her girlhood. But some day the grandmothers will be gone and with them the recollection of the tinder box. Fortunately, the Academy possesses a tinder box, but there are many other contrivances of the pioneer days that it does not possess. If any of these are hidden away in a dark and forgotten attic, let them be brought out and placed where they can be preserved.

THE ACADEMY LIBRARY.

From the museum to the library is but a short step. For scientific work, scientific books are a necessity. Technical books and journals are needed for the specialist, handbooks and more popular works are no less needed for the beginner. Thanks to the thousands of

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exchanges brought in by its own Proceedings and by the gift of several collections of books by its members, the Academy library is well adapted to the needs of the special student. But there are scores of handbooks, manuals and more or less popular treatises which are not on our shelves and which should be secured either by gift or purchase. Then, too, to make it more accessible, the library needs to be catalogued, a large undertaking of which a beginning has already been made.

The Academy library should be enriched by thousands of historical documents, which, unless they are deposited in some such place, will eventually become destroyed. Old manuscripts, old letters, old maps, everything that throws light on the early life in Davenport, in the three cities, or in the West, should be collected and preserved, to be looked at by the curious and made use of by the historian.

The Academy library and the public library, which the city of Davenport is to have, thanks to the generosity of Andrew Carnegie, are very different in nature, the one specialized and technical, the other more general and popular. Each supplements the other. The Academy may well congratulate itself on this new addition to the forces of culture in the city, for as the community becomes more enlightened through the reading of books from the public library it is bound to appreciate to a higher degree the opportunities of the Academy of Sciences. So far as possible the two institutions should coöperate.

TO POPULARIZE MEETINGS.

The regular monthly meetings of the Academy should be made of such interest that they will attract not only the members but outsiders. The meetings should be freed from petty business matters, which should be attended to by committees. Rather they should furnish an opportunity for the thinking people of the three cities to gather, to exchange thoughts in discussion, or to listen to papers or addresses on subjects of interest. A paper or address before a meeting of the Academy need not be the result of life-long research and investigation. It need not bristle with scientific names, with technical terms, with unintelligible references. Such papers are to be read rather than listened to. What are wanted for the meetings of the Academy are papers that are somewhat more popular in nature, expositions in terms that all can understand of the discoveries made by scientists or on any subject to which the interest of the day is drawn. The Academy has had in recent years a number of such addresses. Returning travelers, for instance, have spoken of Egypt and Alaska. Similar talks, whether by travelers or not, should be given on the Philippines, or Hawaii, or South Africa. These are subjects not only of scientific but of popular interest. Near at home extremely interesting talks could be given on the engineering problems involved in the Hennepin canal, the improvement of the Rock Island rapids, the Moline water power and its adaptability for furnishing electrical power, the cause and effect of

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the Mississippi floods. The eclipse of the sun could be described so as to attract general interest. Hundreds would like to learn about X-rays and wireless telegraphy. Other subjects are those in which science comes in contact with agriculture. Would not the farmers of Scott and Rock Island counties appreciate talks on injurious insects, on birds that destroy and on others that protect crops by destroying insects? These subjects are merely suggestive and show what an opportunity the Academy has to take part in the extension of knowledge. There is no reason why many of these papers could not be prepared by the Academy's own brainy and versatile members, and at times scientific men could be induced to come here from Iowa City, from Ames, from Chicago and elsewhere. Courses of popular lectures, of the sort suggested, are given regularly by the Geographical Society at Washington, and are free to members, outsiders being admitted on payment of a small fee. A like plan adopted by the Academy would, it is to be trusted, increase the membership list and make its meetings of interest and value.

READY TO COÖPERATE.

The Academy of Sciences, with its age, record and high purpose behind it, should become the center of the various semi-scientific societies of the city. Its rooms and hall should be thrown open to the medical societies, the agricultural society, the farmers' institute, the pioneers' association, the university extension, and all societies which in any way tend to the advancement and diffusion of knowledge. Should an art gallery ever be established in Davenport, as one certainly should be, it might well find a home in the new building which the Academy hopes to erect.

THE ACADEMY PUBLICATIONS.

The function of the Academy which tells most for its reputation abroad is naturally the publication of its proceedings. This work, supported now by an endowment which might be larger, goes quietly on. Volume after volume is being published, and there is no lack of material for publication. Only papers of the highest grade are accepted and many of these are written by scientists of world-wide reputation. Institutions older and richer than the Academy and located in cities ten times greater than Davenport, may well be envious of our Proceedings.

AN ENDOWMENT NEEDED.

Such are some of the functions of an institution like the Davenport Academy of Sciences. Some of them, such as that of publication, and the amassing of a great and valuable museum and library, it is filling better than could be expected. In others, more has been outlined, perhaps, than the Academy is at present able to undertake, but we need not be discouraged. Before we can accomplish all that we would like to do

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we must have an endowment of from fifty to a hundred thousand dollars, and as much more for a commodious fire-proof building. In the meantime, however, we can do something ourselves, something more than merely waiting, and we can hope that in the near future the Academy may be blessed more generously with endowments, may have a new building adapted to its growing needs, and that it may become the center of renewed scientific life and activity.

May 2, 1900 — TRUSTEES' MEETING.

The President, Mrs. M. L. D. Putnam, in the chair; eight Trustees being present. Routine business was transacted.

May 25, 1900 —REGULAR MEETING.

The President, Mrs. Putnam in the chair; eight members present.

The Curator reported the following additions to the Museum during May:

From C. E. Harrison, three trilobites of the genus *Calymene*. From a gentleman in Sac City, Iowa, a peculiar chameleon from the west.

The Publication Committee reported the distribution of Volume VII. of the Proceedings as follows: To foreign societies, 224; to home societies, 147; to individuals, 36; total distribution, 407.

Mrs. Frank G. Allen, Moline, Ill., was elected a Regular Member and Bishop T. N. Morrison a Life Member of the Academy.

E. S. Ballord gave an interesting account of his recent visit to the Grand Cañon. The talk was informal and a discussion accompanied it.

May 28, 1900 — TRUSTEES' MEETING.

The President, Mrs. Putnam, in the chair; nine Trustees present.

The President stated that the purpose of the meeting was to consider the advisability of making the following improvements and repairs: Connect the two buildings, fit up the auditorium, fit up the basement, lay sidewalk, level up the ground, etc.

It was decided that the improvements and repairs should be made and that the President should appoint a committee of three to carry the work to completion.

The following committee was appointed: A. F. Cutter, C. A. Ficke, W. C. Putnam.

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The President mentioned the fact that about $100 would be needed to transport the collection from Griswold College and rearrange the Museum, whereupon J. B. Phelps generously agreed to donate $100 for that purpose.

June 29, 1900 — REGULAR MEETING.

The President, Mrs. Putnam, in the chair; ten members present.

The Curator reported additions to the Museum as follows:

From Louis Hyde, very rare specimens of fossil shells gathered from the well-known layer of Pipestone rock at Pipestone, Minn., described by Prof. N. H. Winchell. The layer is twelve feet thick, between two immense masses of crystalline rock several hundred feet thick. From Prof. Otis T. Mason, cast of Eskimo child's head from Clarence, Alaska. From the Smithsonian Institute, in exchange, three Indian baskets—one small Pomo basket, one Heyso basket from California, and an Apache carrying basket. From Judge C. M. Waterman, specimen of *Stigmaria ficoides* from Angel's Ferry, Ill. From Edwin A. Clark, Princeton, Iowa, a pair of very old spectacles with large, round glasses and flat nose piece.

The Publication Committee reported the completion of Prof. Starr's paper on "Ethnography of Southern Mexico," being part of Volume VIII., and that the paper on "The Flora of Scott and Muscatine Counties, Iowa," by Barnes, Reppert and Miller, was in the hands of the printer. The committee further reported that Prof. Starr had presented his album, "Indians of Southern Mexico," and four extra plates to the Academy.

Miss Marian E. Sparks, engaged to make a card catalogue of the Library, reported that it would take several months to complete the work. She had written to 104 societies to obtain volumes to fill out sets. Fifty-six had sent the numbers asked for and six had promised to do so. She said about 1,000 to 3,000 volumes should be bound for safe keeping, convenience and appearance.

John R. Putnam, late of China, was elected a Regular Member.

July 27, 1900 — REGULAR MEETING.

First Vice-President, C. A. Ficke, in the chair; fourteen members present.

The Curator reported the following donations to the Museum:

From Mrs. Grace B. Buford, Rock Island, Ill., an Indian costume, hatchet, pipe, stone hammer or war club, and a cane made from the

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"diamond willow." From Joseph Duncan, Chicago, Ill., an Indian dress decorated with beads and a pair of Indian moccasins, presented to Governor Duncan seventy years ago. From W. C. Putnam, the head and antlers of an elk.

Mrs. E. Hurst, Rock Island, Ill., was elected a Regular Member.

The following resolutions of respect to the memory of the late John B. Phelps were adopted:

WHEREAS, In the death of John B. Phelps, the Davenport Academy of Natural Sciences has lost a warm friend and honored associate, and a long-time life member, one who throughout the twenty-five years of his active connection with it has been at all times a ready and most efficient helper, and to whose guidance, both as chairman of the finance committee and as trustee during many years, it is much indebted; therefore be it

Resolved, That we record hereby our appreciation of his genuine worth, our deep sense of the loss sustained in his death, and our sympathy with his bereaved household.

Resolved, That these resolutions be spread on the minutes of the Association, and that copies be transmitted to the family and to the papers.

C. H. PRESTON.
C. A. FICKE.
W. C. PUTNAM.

In behalf of the Trustees of Griswold College, the Right Reverend Theodore N. Morrison, Bishop of Iowa, formally presented to the Academy the scientific library and geological collection of Griswold College. In making the presentation he spoke of the impossibility of Griswold College continuing its existence and of the increased work that would be done at Saint Katharine's Hall. The desire of the Trustees of the College was that the library and valuable geological collection be kept together where they could be examined and studied by the largest number of people. All scientific work and all other books that the Academy desired are to become the property of the institution and the remainder are to go to the Davenport public library.

First Vice-President, C. A. Ficke, responded in behalf of the Academy in part as follows:

In the absence of Mrs. Putnam, President of our Association, who unfortunately is unable to be present to-night, it becomes my pleasant task, honored Bishop, in behalf of the Davenport Academy of Sciences, to accept the generous gift which the Trustees of Griswold College, through you, so kindly tender. This gift, pleasing in itself because of its great value, is even more welcome as a proof of the fact that the good work of the Academy is appreciated by those who tender it. It is gratifying beyond measure that our Academy was deemed worthy of becoming the owner of a collection and a library which Bishop Lee, Professor Sheldon, Professor Barris and other enthusiastic scientists

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and collectors have spent so many years in accumulating. To you, honored Bishop, and through you to the Trustees of Griswold College, I wish to extend the sincere thanks of the Davenport Academy of Sciences for this most generous and valuable gift.

On motion of C. E. Harrison, seconded by Dr. C. H. Preston, it was resolved that the Academy accept the gift, and that sincere thanks be extended to Bishop T. N. Morrison and the Trustees of Griswold College, and that the following report of a meeting of a committee appointed by the Trustees of Griswold College be spread upon the minutes:

The committee appointed by the Trustees of Griswold College at a meeting held June 12, 1900, to whom was referred the disposal of the library and other property — geological specimens, minerals, shells, etc., etc. — belonging to the Griswold College, with power to act, held a meeting at the Episcopal residence, Davenport, Iowa, on July 27, 1900. Present: the Bishop, the Rev. N. S. Stephens, and the Rev. C. H. Weaver, L.L.D.

The Rev. Dr. Weaver was appointed Secretary. The following motion was passed unanimously:

Resolved, That all such books as relate to science, and such other historical books as the authorities of the Academy may think of value to the institution, together with all specimens relating to the several departments of geology, mineralogy and conchology be and they are hereby presented to the Davenport Academy of Sciences, together with the cases in which they are arranged, it being the conviction of the committee that this valuable collection should be kept together and placed where it may be examined and studied by the largest number of people.

THEODORE N. MORRISON, *Bishop of Iowa.*
CLINTON H. WEAVER, *Secretary of Committee.*

After the meeting, those attending paid a visit to Science Hall, the newly acquired building, in the basement of which the valuable collections were arranged.

September 28, 1900 — REGULAR MEETING.

The President, Mrs. Putnam, in the chair; seven members present.

The Curator reported the following donations to the museum:

From Prof. J. A. Udden, a package of *Fusilina* from the coal measures of Pottawattamie county, Iowa. From W. H. Forrest, a portrait of Mrs. D. S. True; a collection of the larger ocean shells with many smaller forms; corals, ancient and recent, large and small; and minerals — some very fine — from western localities. From G. R. Putnam, a very fine mounted fur seal from Pribilof Islands; the skin of a Greenland polar bear; and a pair of Eskimo gloves. From Mrs. Tracy, Harbor Point, Mich., two polished specimens of coral from the Hamilton group, and a specimen of opalized agate. From W. C. Putnam, four horizontal show-cases and six upright wall cases for the museum.

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The Publication Commitee reported the completion of the paper on the "Flora of Scott and Muscatine Counties."

Miss Marian Sparks reported progress in cataloguing. On motion it was decided to put in more shelving for the library and to retain Miss Sparks.

The committee, consisting of E. S. Hammatt and C. A. Ficke, reported that due notice of the proposed amendment to the Articles of Incorporation, by dropping the word "Natural" from the title of the Association, had been published in the papers, and upon motion the amendment was made.

In consideration of the donation to the Academy of his submarine collection from the Bahama Islands, Webb Ballord was elected a Life Member.

October 26, 1900 — REGULAR MEETING.

The President, Mrs. Putnam, in the chair; five members and several visitors present.

The Curator reported additions to the Museum as follows:

From C. E. Harrison, a carefully prepared and mounted skeleton of a rattlesnake. From Elizabeth D. and W. C. Putnam, a large and valuable collection of Indian relics found in the grave of an Ottawa chief near Harbor Springs, Michigan. The collection contains, in part, the skeleton of a man, a number of copper kettles, and all the honorary decorations of a chieftain, the skull being encircled by a silver band, and further ornamented by a small silver turtle, which was the standard of the Ottawa chief, Little Turtle. This chieftain was the hero of the battle between the Ottawas and the Musquatas, which resulted in the extermination of the latter tribe. War implements, such as stone axes, spear-heads, arrow-heads, iron scalping knives and tomahawks, and portions of flint-lock muskets; a number of large circular silver pieces used as money, and a great number of dress ornaments, brooches, ear-rings, bracelets, etc.; silver crosses with one, two and three bars, which were given the Indians by the Jesuits; the finger bones of a hand still bearing the silver rings. The collection numbers several hundred specimens.

A committee was appointed to make arrangements for the opening of Science Hall on December 14th, 1900.

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November 30, 1900 — REGULAR MEETING.

The President, Mrs. Putnam, in the chair; eight members and several visitors present.

Thomas Scott, Davenport, Iowa, was elected a Regular Member, and T. D. A. Cockerell, East Las Vegas, New Mexico, and Charles Webster, Charles City, Iowa, were elected Corresponding Members.

The committee on the opening of Science Hall, Friday evening, December 14, 1900, reported, and the following committees were appointed to complete arrangements:

Reception — C. A. Ficke, Dr. A. W. Elmer, Dr. William Allen, Edward Roberts.

Tickets and Door — C. E. Harrison.

Press — A. A. Miller.

Refreshments — Miss Alice Kimball.

Miss Sparks reported the work of cataloguing as nearly completed. The catalogued books include 2,336 works, 10,016 volumes on 983 subjects, and 7,163 cards were used.

The session was closed with a talk by Edward K. Putnam upon the various elements that enter into the English language. He traced the changes of the Anglo-Saxon through middle English into modern English, illustrating the rules governing these changes by examples of modern words and idioms. He also discussed the Norman, Scandinavian and other influences on the language.

December 14, 1900 — OPENING OF SCIENCE HALL.

On this evening, the thirty-third anniversary of the founding of the Academy, Science Hall was dedicated to the cause of science in the presence of an audience numbering about five hundred, including a large delegation from the High School. The Honorable C. A. Ficke, First Vice-President, presided. On the stage were seated the lecturer of the evening, Professor Frederick Starr of the University of Chicago; President MacLean and Professor C. C. Nutting of the State University of Iowa, and several of the more active local members of the Academy, including the President, Mrs. Mary L. D. Putnam.

The Reverend Dr. J. B. Donaldson, pastor of the First Presbyterian Church, opened by prayer.

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In his introductory remarks, Mr. Ficke congratulated the Academy, the citizens of Davenport, and of the State of Iowa as well, on the establishment of Science Hall.

President MacLean said he brought to the Academy and the citizens of Davenport congratulations, not only on behalf of the State University with its faculty of 130 and its 1,500 students, but also on behalf of all the public schools, academies and colleges of the state. The Davenport High School, he said, led all others in the state in sending students to the University and to other higher institutions of learning. He regarded the Academy of Sciences as a valuable addition to the educational facilities of the city and state. Science, he said, was no longer looked upon as antagonistic to religion and poetry, but went hand in hand with all other educational and uplifting influences. He closed with a reference to the achievements of woman and paid a tribute to Mrs. Putnam for what she has done for the Academy.

Professor Nutting, also of the State University, said, in substance:

I represent the scientific department of the State University and we are glad to meet our friends of science here. We feel it is due to the Academy that we should come here this evening. I have often wondered what the people of Davenport are to make of the Academy of Sciences. For some years I have been in charge of a museum and I have been interested in the way the public thinks of and values a museum. A man once came to me and asked, "Will the amusement be open to-day?" meaning the museum. I have often thought I would like to prepare a lecture on "The Public in a Museum," for the reason that this man's remark was significant, indicating the popular notion that a museum is a place where one may go to see things and thereby be amused. Among the objects for which museums are established, the least important is amusement. It should be the aim of the people to seek instruction in the highest sense of that word. A museum is a place for research, for study and for work. I hope the school children of this city will be led to consider this museum from that point of view, and that they will be induced to use freely the valuable collections that you have here. This Academy is unique in that nowhere in the West has such a museum been sustained for so long a time in a city the size of Davenport. I feel that you are to be congratulated on the past as well as on the present achievements.

The Professor closed with the following:

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THE STORY OF TWO WOMEN.

There was a woman on whose heart was pressed the heavy hand of Sorrow.
Her heart was bruised, her head was bowed, her life bereft of hope and light.
This woman was not strong, and so she sat her down and cried:
"Woe has come upon me, and my love lies dead, his work unfinished.
No more is heard his name upon the lips of men. With him is Hope entombed.
Henceforth my life shall be devoid of light, and o'er his grave I'll place
A broken shaft to show the incompleteness of his life cut short of full fruition."
And so it was. Her life was void. His name forgotten in the homes of men.

Again there was a woman on whose heart was pressed the heavy hand of Sorrow.
Her heart was sore, her head bowed low, her life bereft of light.
But strong this woman was, and brave, and she stood up amid the stress
Of this her dire calamity, and gazed undaunted on the face of Sorrow.
"My love shall live!" she said. "His work unfinished I take up. My life I give
To see his hope fulfilled. His name shall still be spoken in the courts
Of Wisdom, and a monument I'll raise to show fruition of his cherished hopes!"

And so it was. And wise men came to bring her aid. And lo! Her life was full
Of light, and blessed with fruitful works. No broken shaft raised she
Above his tomb. Instead she reared a monument enduring as is Truth eternal.
And the wise men bring the tribute of their learning to this shrine.
His name is honored still in Wisdom's court. His work complete. His hope fulfilled,
And Sorrow conquered, chastened, owns the sway of Love.

Professor Starr, of the University of Chicago, said he had known the Davenport Academy of Sciences for twenty-five years. When a schoolboy in Iowa he had been attracted by the reports of its meetings, and especially in its explorations of the mounds. Ten years later, while teaching in Coe College, Cedar Rapids, he felt the need of a scientific library, and came to Davenport, where he spent ten days studying in the Academy's library and museum. Since then his interest in the institution had been increasing. Continuing, he said, in substance:

The people of this city should be proud of the Academy. In the first place, we have here a library of many volumes that are rare and

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precious. We have the old building, we have the new building and we have the museum — one of the best, according to its size, to be found in the whole country. In that museum are many rare treasures. But, after all, the museum is one of the least important things about this Academy, for the monthly meetings, where the handful of enthusiastic devotees of science come together to keep the sacred fires lighted, are the important things. The publications of the Academy are also important, for they penetrate to all the libraries and universities of the world and bring back in exchange the thoughts of all scientific scholars to enrich the Academy's library. The Davenport Academy is known in many cities of the old world where the name of Chicago is unknown, and where the University of Chicago has not yet been able to make itself felt.

But what of the future? One sees erected on this site a large building with its corps of officials, its museums occupying one of the floors that extend from the street to the alley. One sees that courses of lectures are given every year, and the public is interested as never before in the study of science. To those who are interested in this work it is not necessary to call attention to the thirty-three years of achievement that lie in the past. Now for the future. It is the duty of those who are interested in this work to go out as missionaries and interest others until the whole city shall be alive to the value and the helpfulness of this magnificent local institution.

Professor Starr then delivered his interesting lecture on "The Indians of Southern Mexico," which was illustrated by stereoptican pictures.

At the conclusion of the lecture, opportunity was given those present to inspect the Griswold College and other collections which had been placed in the museum annex in the basement of the newly-acquired building, where refreshments were served.

Many letters were received from friends congratulating the Academy on its success. Among these letters, one from Prof. McBride seemed of especial interest:

To Mrs. M. L. D. Putnam, *President of the Davenport Academy of Sciences.*

Dear Friend — I regret exceedingly that a previous engagement will prevent my being present on December 14 to bring you in person my earnest congratulations on the triumphant management of the Davenport Academy of Sciences. There is certainly no other success like it in Iowa, and I do not believe there is in any other state, and men of science everywhere are bound sooner or later to recognize that fact.

Through evil report and good report, in good times and bad times, you have persisted with a perseverance and patience beyond all praise, determined that whatever else might come and go, your fortunate city should not be without the inspiration of modern scientific research and the stimulus of modern scientific thought. For three and thirty years, especially from those days when your gifted young member, J. Duncan Putnam, charmed

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us all by the beauty and elegance of his works, all too early ended, until the present hour, in the world's Council of National History, the voice of Davenport has never once been silent. The Davenport Academy, may it flourish forever, growing in usefulness and in the good esteem of all intelligent men.

Very sincerely yours,

Iowa City, Iowa, Dec. 10, 1900. THOMAS H. MCBRIDE.

December 28, 1900 — REGULAR MEETING.

Vice-President C. A. Ficke in the chair; seven members present.

The Curator reported the following additions to the museum:

From C. E. Harrison, the skull of a woodchuck; two large, framed photographs, the first, of Scott County's first court house, the second, of the ruins of Hill's block, northwest corner of Brady and Third streets, destroyed by fire on the night of February 22, 1876. This is of special interest, as upon that night the Ladies' Centennial Association was having a fair and festival in Hill's Oper House for the purpose of raising funds to publish Vol. I. of the Proceedings of the Academy. From Capt. W. P. Hall, a box containing two hundred flint instruments of various shapes and sizes, and twelve grooved axes, some worn with age or use. From Jacob Shibe, Rapids City, Ill., a large Scotch curling stone, highly polished, weighing 37½ pounds, and made of Scotch granite. Through favor of Bishop Morrison and the Board of Trustees, the Griswold College cabinet has been presented to the Academy, and the gift deserves grateful recognition. It comprises several distinct collections, among which are the fresh water shells of the immediate vicinity. As early as 1866, Agassiz visited Davenport, called on Prof. Sheldon and expressed his astonishment at the range of the collection, saying that it seemed to him the richest conchological section between the Atlantic and Pacific oceans. With that thoroughness and system which characterized all his work, Prof. Sheldon arranged the shells so as to facilitate their study. They were so placed on the shelves that the different sizes, forms and their internal structure might be taken in at one view. Prof. Sheldon furnished a similar collection for the cabinet at Harvard. There are over seven hundred marine shells, some collected and some obtained by exchange. They are from China, Japan, West Indies, Sandwich Islands, the Mediterranean, the waters of the American coast, and from the depths of the ocean. The collection of minerals is of wide range, including calcedony from India, volcanic rock from Iceland, silver and gold from the Rockies, crystals of quartz and lime from different parts of the United States. A mass of meteoric iron from Dakota, so pure that it is malleable. From the quarries around Davenport, a valuable collection of fossils, arranged for college class-work. Foreign fossils were added for the purpose of comparison. The cabinet of Rev. Dr. Peet, of great extent and value, was gathered by extensive travel in foreign countries. The collection of crystals is the most interesting

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part, wonderful in the size and beauty of each individual crystal, and, still more wonderful, in the variety and delicacy of color, brought out by massing the crystals of different minerals. In passing I note the collection of garnets in mica-slate, pronounced by Prof. Silliman to be the finest specimens ever shown. It is a matter of deep regret that the systematic arrangement of this great collection has not been preserved, many specimens being misplaced and many labels lost. The donation of Webb Ballord, a member of the "Bahama expedition," is a thoroughly scientific collection. It teems with wonderful and various forms of life in tropical waters, pleasing to the eye of the casual observer and instructive to the student of natural history. J. H. Paarmann is now gathering together the various zoölogical specimens and arranging them in a scientific manner. I trust the members of the Academy will appreciate his excellent work.

The following resolution was unanimously adopted:

E. S. Carl, a prominent citizen of Davenport and an honored member of the Academy of Sciences, having died in October, 1900, the members of this Academy wish to place on record their appreciation of his many admirable qualities and of his interest in all enterprises pertaining to the improvement and advancement of the City of Davenport, and especially of the great interest he has always manifested in this institution.

W. C. PUTNAM.
C. A. FICKE.

Resolutions were also adopted on the death of Mrs. J. J. Humphrey, a Regular Member.

In connection with the recent dedication of Science Hall, resolutions were passed thanking the local press, the friends of the Academy who came from a distance to participate in the exercises, and to the friends at home, whose efficient aid made the entertainment such a success.

On motion, the chairman appointed the following nominating committee to nominate officers for 1901: C. A. Ficke, A. F. Cutter and E. S. Hammatt.

A visit was then made to the zoölogical collection in the museum, and Mr. Paarmann explained his method of classifying and arranging the specimens.

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ELECTIONS TO MEMBERSHIP.

JUNE 1, 1899, TO MAY 1, 1901.

CORRESPONDING MEMBERS.

W. D. Barnes, Morgan Park, Ill.....July 28, 1899.
Prof. E. J Hill, Englewood, Ill.....July 28, 1899.
Rev. Kempke, Davenport, Iowa.....July 28, 1899.
T. D. A. Cockerell, East Las Vegas, New Mexico .....November 30, 1900.
Charles Webster, Charles City, Iowa.....November 30, 1900.

REGULAR MEMBERS.

Residence, Davenport, unless otherwise stated.

W. G. Smith .....July 28, 1899.
Rev. G. S. Rollins .....July 28, 1899.
Horace Roberts .....September 29, 1899.
A. L. Hageboeck .....September 29, 1899.
John M. Helmick.....September 29, 1899.
Ernest C. Oberholzer .....October 27, 1899.
Mrs. Frank Gates Allen, Moline, Ill .....May 25, 1900.
John R. Putnam, China .....June 29, 1900.
Mrs. E. Hurst, Rock Island, Ill.....July 27, 1900.
Thomas Scott .....November 30, 1900.
J. H. Paarmann, Iowa City, Iowa .....January 26, 1901.

LIFE MEMBERS.

Bishop T. N. Morrison.....September 29, 1899.
Thomas W. Griggs .....September 29, 1899.
Wilson McClelland.....October 27, 1899.
Webb Ballord.....September 28, 1900.
A. F. Cutter. .....January 26, 1901.

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BY JOHN ANDREAS UDDEN.

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PLATE I.

Fig 1. Bacunculus tenuescens. $\frac{3}{1}$. Florida.

2. *The same*; lateral view of end of abdomen. $\frac{4}{1}$.

3. Sermyle strigata. $\frac{3}{1}$. Texas.

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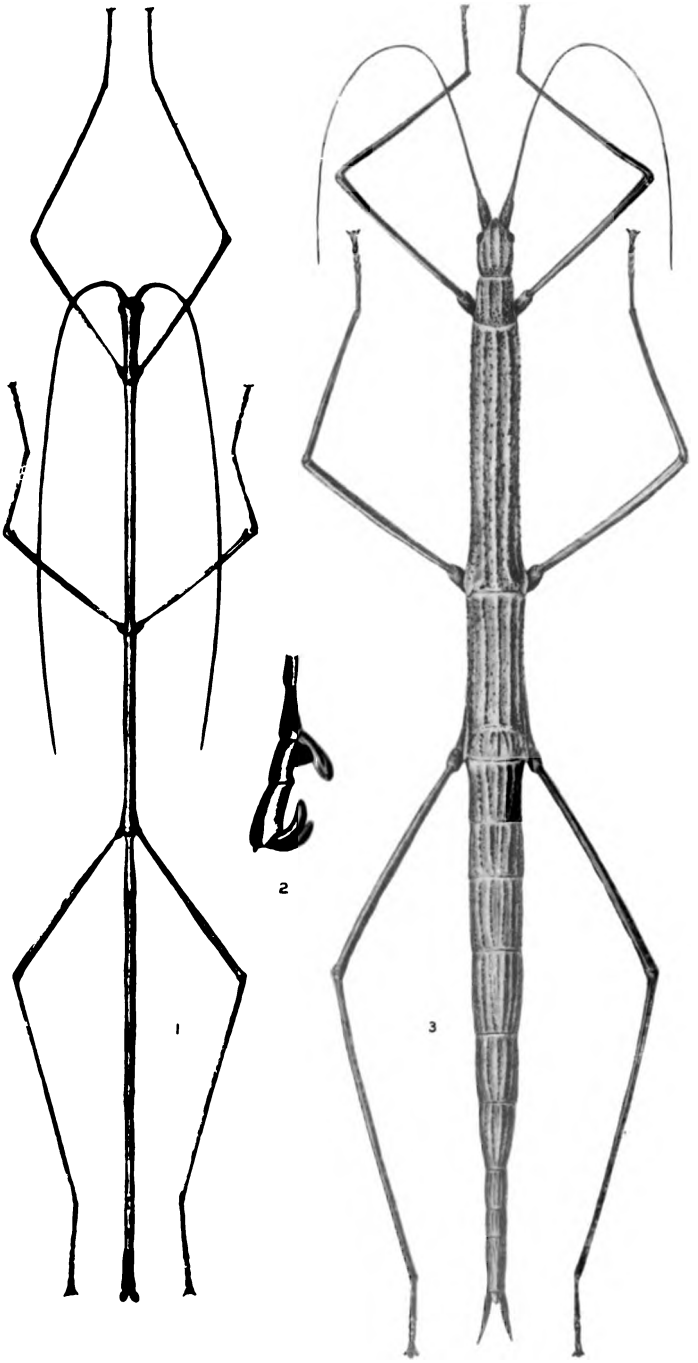

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PLATE II.

All the figures are enlarged two diameters.

Fig. 1. Eremopedes unicolor. Arizona.
2. Idionotus brunneus. California.
3. Ateloplus notatus. California.
4. Loboptera americana. Arizona.
5. Pelmatosilpha rotundata. Texas.

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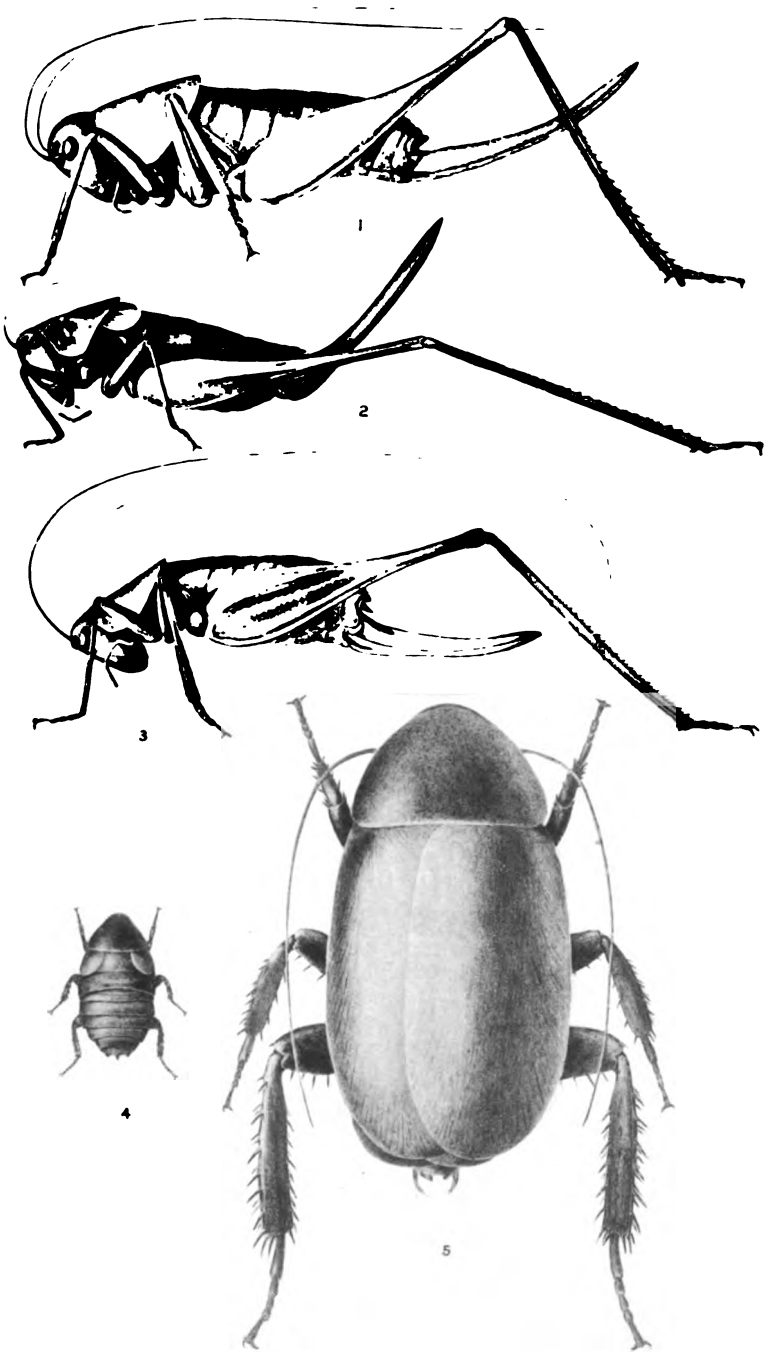

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PLATE III.

Both the figures are enlarged two diameters.

Fig. 1. Hormilia elegans. New Mexico.

2. Plectrotettix patriae. California?

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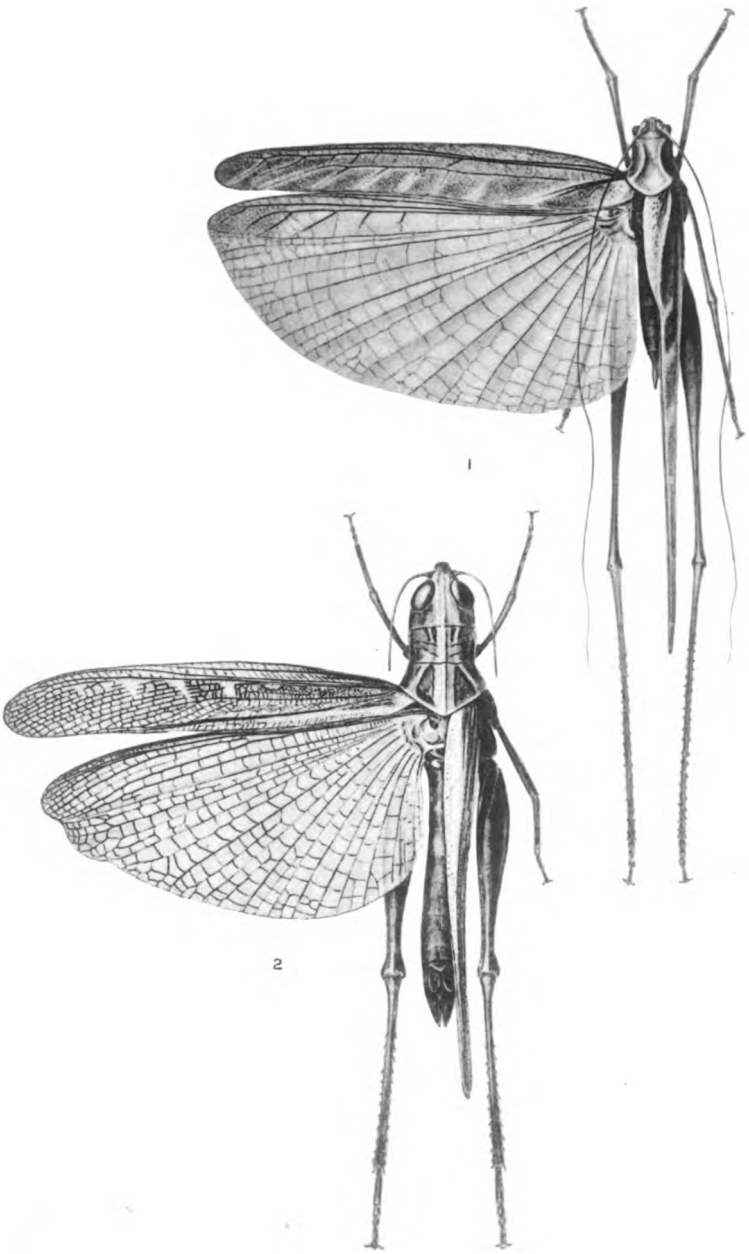

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